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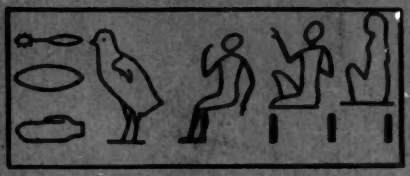
CHILD DEVELOPMENT



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THE SOCIAL MATURITY OF THE VISUALLY HANDICAPPED PRESCHOOL CHILD[1]

KATHRYN ERROLL MAXFIELD
and
HARRIETT ANDERSON FJELD

No satisfactory diagnostic instrument has been available for use in measuring the development of very young visually handicapped children. The Hayes-Binet Test has proved valuable for testing the intelligence of blind children who are 6 years old or more, but it does not go below the 3-year level and is not as well standardized below year 6 as above that age level. With partially seeing children the tests and scales for the seeing sometimes can, sometimes cannot, be used effectively. Often they should be supplemented in order to check the child's performance in terms of his degree of vision and in terms of his ability to get along as an independent human being of a given length of life experience. Unfortunately no such supplementary instrument has heretofore been available for use with blind and low-visioned children under school age.

It can scarcely be hoped, because of the complexity of the problem, that any single diagnostic instrument will be adequate to meet this need. There is a growing realization that even in work with seeing children, such instruments should be used as guides and not as absolute measures. However, when the Vineland Social Maturity Scale appeared, it gave promise as an indicator of growth in social competence for small visually handicapped children even though it was intended originally for use with the seeing.

The use of this Scale was inaugurated, for the purpose of studying its value, as a part of the regular routine at the Arthur Sunshine Home and Nursery School for the Blind in 1935. In 1938, financial difficulties necessitated the closing of the Arthur Home, thus also bringing to a temporary close our work on the study of the Vineland Social Maturity Scale.

On both the first and the second projects there has been splendid cooperation from agencies for the blind having preschool children under their care. Grateful appreciation is expressed to the following organizations: The New York Association for the Blind, the New York State Bureau of Services for the Blind, the Connecticut School for the Blind, the Boston Nursery for Blind Babies, and the Pennsylvania Institution for the Instruction of the Blind. Several parents also cooperated.

Before the close of the first period, at the suggestion of Dr. Doll, Mrs. Bradway spent sufficient time at the Arthur Home to give valuable suggestions on procedures and interpretations. She had already made a study at the Pennsylvania Institution for the Instruction of the Blind which gave her considerable insight into the problems involved (3).

[1]*The extension and completion of this study was made possible through a grant-in-aid to Dr. Maxfield by the Social Science Research Council.*

The authors are grateful to Dr. Edgar A. Doll for his generous offers of assistance throughout the project and for his critical review of the manuscript.

Since the full report is too long for publication, two copies of it, in manuscript form, have been placed on file in the Lending Library of the American Foundation for the Blind, 15 West 16th Street, New York City.

THE PROBLEM

The purposes of the project have been: first, to evaluate the Vineland Social Maturity Scale as a useful measure of the general social competence of visually handicapped preschool children; second, to work toward a tentative revision of the Scale which would make it more adequate for comparing visually handicapped children with each other; and third, to discover specific items on which visually handicapped children are retarded and which might serve as bases for future studies.

To accomplish these purposes the data have been treated in three different ways. First, a quantitative investigation was made, the results of which were merely indicative, owing to the wide variability among relatively few subjects; second, seventeen case histories were studied, each in relation to a series of ratings on the Social Maturity Scale, and third, an evaluation of the individual items was made on the basis of all available material.

METHOD AND PROCEDURE

Materials. As has already been indicated, the Vineland Social Maturity Scale was the chief instrument used in this study (7). According to Dr. Doll it covers an unlimited age range but standardizes normatively from birth to 30 years, with the average adult ceiling at 25 years. Sixty-five items fall below the 7-year level.[2] The Scale was standardized on seeing people.

Doll, who supervised its construction, states: "The items of the Scale avoid the measurement of intelligence, personality, habits, skill, and the like, as such, focusing instead on the composite capitalization of such abilities for socially significant behavior" (5). In other words, it aims to be a measure of what might be called effective social behavior. Bradway, in her study of 300 feebleminded subjects, found a correlation of .85 between social age and mental age, and she states that, on the average, children of high intelligence would be expected to obtain higher absolute scores but lower relative scores than would children of low intelligence (2).

The whole Scale consists of 117 items, only the first 77 of which were used for this study. The 77th item was chosen as the end of the series because it was the last item in that year level which contained the last plus score for any of the children in our group. The items are numbered in order of increasing average difficulty as found for the normal seeing children used in Doll's study (5). They are grouped by age levels with from 3 to 17 items at each level. Furthermore, the items have been classified under the following categories:

Self-Help, General (SHG)	Locomotion (L)	Self-Direction (SD)
Eating (SHE)	Occupation (O)	Socialization (S)
Dressing (SHD)	Communication (C)	

[2] *For purposes of this study 7 years has been considered the upper limit of the preschool age, because of the fact that visually handicapped children are likely to be retarded in entering first grade.*

The items arranged according to age-levels, for the section of the Scale we have used, are as follows:

0 - I

C	1.	"Crows"; laughs
SHG	2.	Balances head
SHG	3.	Grasps objects within reach
S	4.	Reaches for familiar persons
SHG	5.	Rolls over
SHG	6.	Reaches for nearby objects
O	7.	Occupies self unattended
SHG	8.	Sits unsupported
SHG	9.	Pulls self upright
C	10.	"Talks"; imitates sounds
SHE	11.	Drinks from cup or glass assisted
L	12.	Moves about on floor
SHG	13.	Grasps with thumb and finger
S	14.	Demands personal attention
SHG	15.	Stands alone
SHE	16.	Does not drool
C	17.	Follows simple instructions

I - II

L	18.	Walks about room unattended
O	19.	Marks with pencil or crayon
SHE	20.	Masticates food
SHD	21.	Pulls off socks
O	22.	Transfers objects
SHG	23.	Overcomes simple obstacles
O	24.	Fetches or carries familiar objects
SHE	25.	Drinks from cup or glass unassisted
SHG	26.	Gives up baby carriage
S	27.	Plays with other children
SHE	28.	Eats with spoon
L	29.	Goes about house or yard
SHE	30.	Discriminates edible substances
C	31.	Uses names of familiar objects
L	32.	Walks upstairs unassisted
SHE	33.	Unwraps candy
C	34.	Talks in short sentences

II - III

SHG	35.	Asks to go to toilet
O	36.	Initiates own play activities
SHD	37.	Removes coat or dress
SHE	38.	Eats with fork
SHE	39.	Gets drink unassisted
SHD	40.	Dries own hands
SHG	41.	Avoids simple hazards

SHD 42. Puts on coat or dress unassisted
O 43. Cuts with scissors
C 44. Relates experiences

III - IV

L 45. Walks downstairs one step per tread
S 46. Plays cooperatively at kindergarten level
SHD 47. Buttons coat or dress
O 48. Helps at little household tasks
S 49. "Performs" for others
SHD 50. Washes hands unaided

IV - V

SHG 51. Cares for self at toilet
SHD 52. Washes face unassisted
L 53. Goes about neighborhood unattended
SHD 54. Dresses self except tying
O 55. Uses pencil or crayon for drawing
S 56. Plays competitive exercise games

V - VI

O 57. Uses skates, sled, wagon
C 58. Prints simple words
S 59. Plays simple table games
SD 60. Is trusted with money
L 61. Goes to school unattended

VI - VII

SHE 62. Uses table knife for spreading
C 63. Uses pencil for writing
SHD 64. Bathes self assisted
SHD 65. Goes to bed unassisted

VII - VIII

SHG 66. Tells time to quarter hour
SHE 67. Uses table knife for cutting
S 68. Disavows literal Santa Claus
S 69. Participates in pre-adolescent play
SHD 70. Combs or brushes hair

VIII - IX

O 71. Uses tools or utensils
O 72. Does routine household tasks
C 73. Reads on own initiative
SHD 74. Bathes self unaided

IX - X

SHE 75. Cares for self at table
SD 76. Makes minor purchases
L 77. Goes about home town freely

Each total score can be translated into a Social Age, or Age Equivalent, and by dividing this Social Age by the life age and multiplying by 100, it is possible to obtain a Social Quotient (SQ), or an index somewhat comparable to the IQ. The mean SQ for normal seeing children was found to be approximately 100.

Additional material obtained from the other records of the children at the Arthur Home was utilized in this study. This material includes records of physical condition, of behavior, of progress in the nursery school, and of various factors which might affect emotional stability.

Subjects. A total of 101 visually handicapped children ranging in age from 9 months to 6 years and 10 months was used. They varied in mental ability from an extremely low level to very superior. They ranged in vision from total blindness to a degree of sight which made it possible for them to get about independently.

Pertinent characteristics of the children are shown in Table 1. The main group, of 92 subjects, used in the quantitative analysis has been designated as Group I. These 92 children have been roughly classified according to mental ability and degree of vision.[3]

The classification of the children according to intelligence was of necessity rather arbitrary. The lack of a satisfactory instrument for measuring the intelligence of visually handicapped preschool children has already been discussed. Under the circumstances the best that could be done was to divide these subjects into three general groups, superior, normal, and retarded. Those children who could reasonably be so placed were included in the normal group. Most of the subjects had been known and observed by experienced workers over a sufficiently long period of time to justify their classification on this general basis. For a few of the older subjects fairly satisfactory Hayes-Binet scores were available.

The children were also classified according to degree of visual handicap. It is extremely difficult, often impossible, to be sure of the degree of visual defect in very young subjects except in cases such as enucleation or anophthalmos. For purposes of this study, those having no vision or only light perception were classified as blind, whereas those who had what appeared to be a usable degree of sight were classified as having partial vision.

Procedure. The data include material gathered under the auspices of the Arthur Home, together with additional records obtained after the beginning of work on the present project, through the excellent cooperation given by a few private families and by the organizations mentioned earlier in this report. All of the recordings were made by trained workers who had at one time been connected with the Arthur Home, except

[3]*The full report discusses more fully the characteristics of the children.*

for those obtained through the New York State Bureau of Services for the Blind. After careful study, Miss Gertrude Van den Broek of the Bureau, graciously consented to take these records on children whom she was visiting throughout the State.

TABLE 1

VARIOUS CHARACTERISTICS OF THE 101 SUBJECTS IN THIS STUDY

Groups	Total	Boys	Girls	Colored	Additional Handicaps	Premature	Serious Illnesses	Progressive Visual Loss	Vision Improved	Visual Defect Noticed Within: 2 weeks	1 year	2 years	3 years	5 years	Unknown
Total Group	101	61	40	12	15	5	42	4	20	60	22	3	3	1	12
I. Prin. Group	92	57	35	12	14	5	38	4	19	53	20	3	3	1	12
a. Superior	16	12	4	1	3	1	6	2	4	6	5	1	0	0	4
b. Normal	55	27	28	6	5	1	21	2	12	34	11	2	3	1	4
c. Retarded	21	18	3	5	6	3	11	0	3	13	4	0	0	0	4
x. Part. Seeing	46	24	22	6	5	1	14	0	15	29	9	2	0	0	6
y. Blind	46	33	13	6	9	4	24	4	4	24	11	1	3	1	6
II. Very Retarded Group	7	4	3	0	0	0	4	0	1	6	1	0	0	0	0
III. Special Cases	2	0	2	0	1	0	0	0	0	1	1	0	0	0	0

Records of the Arthur Home children were taken at approximately 3-month intervals. From one to 12 records were made for each child, the actual number depending upon the length of residence in the Home after the use of the Scale was adopted. Similar series were obtained on a few other children. In addition, single records were available for a considerable number of subjects.

RESULTS AND THEIR EVALUATION

I. Quantitative Results

The quantitative analyses are based on single records obtained on 99 subjects ranging in mentality from very retarded to superior, and on longitudinal data consisting of a series of 3 records each for 31 subjects.

A. Principal Results

1. The visually handicapped versus the seeing preschool child. The first task was to compare the behavior of young visually handicapped children with that of normal seeing children of corresponding ages as shown by their scores on the Vineland Social Maturity Scale. The 92 subjects, (Group I), used for this purpose ranged in age from 9 months

to 6 years, 10 months and in intelligence from retarded to superior (Table 1).

Table 2, which is not presented here, gives the number of subjects at each life-age level according to groups.

Table 3, which is also omitted, gives gross data regarding life age, social age, and social quotient. As might be expected, it was found that these children average considerably lower in SQ than do normal seeing children, that is, 83.54 for the handicapped as compared to approximately 100 for the seeing children. Even more striking is the extreme variability of the handicapped children as is shown by an S.D. of ± 29.28 and a range of 26 - 163. It was found that the average (83.52) for the normal handicapped group (Group I-B) was about the same as for the whole of Group I and although the S.D. and range were considerably reduced (±18.45 and 40 - 119) they were still very large. Likewise the superior and retarded groups (I-a and c) showed wide variability. It is this extreme variability which makes it doubly necessary to judge with care when working with young visually handicapped children.

Since the items are arranged on the Scale in order of difficulty for seeing children, it was possible to make a comparison between the seeing and the visually handicapped group on the basis of rank order of difficulty of the individual items. This showed whether there were specific items which stood out as particularly difficult or as comparatively easy for the handicapped group, and whether these items clustered together into any sort of pattern.

There were 29 items on which the visually handicapped group differed from the Scale by as much as, or more than, five points in rank order of difficulty. Fifteen of these were relatively easier and 14 relatively more difficult for the handicapped group. It should be pointed out, however, that while the items are presumably arranged on the Scale in order of difficulty for normal seeing children, there is no claim that the steps are of equally increasing difficulty. Thus, a difference of 5 points in order of difficulty may mean a big difference at one point on the Scale and a much smaller difference at another point. Nevertheless, a shift in rank order of as much as 5 points seems to suggest possible significance since the number of items at any single year level is not great.

A close scrutiny of the 29 items mentioned above is of interest. The 14 items which were relatively more difficult for the visually handicapped children than for the seeing children by a difference of more than 5 points are given below. These items are listed under the categories in which they belong in the Scale, in order to disclose any possibility of groupings of this type. The number in parenthesis following the category name indicates the total number of items in the category within the range of the 77 items included in this analysis. The number in parenthesis following each item indicates the number of points' difference in rank order of difficulty compared with the Scale as standardized on normal seeing children.

Self-Help
  General (14 items)
    66. Tells time to quarter hour (9.5)

Eating (12 items)
28. Eats with spoon (5)
33. Unwraps candy (6)
38. Eats with fork (9)
Dressing (12 items)
47. Buttons coat or dress (5)
Locomotion (8 items)
Occupation (11 items)
19. Marks with pencil (15)
22. Transfers objects (8)
24. Fetches or carries familiar objects (8)
43. Cuts with scissors (10)
Communication (9 items)
10. "Talks"; imitates sounds (5)
58. Prints simple words (10)
63. Uses pencil for writing (8)
Self-Direction (2 items)
Socialization (9 items)
4. Reaches for familiar persons (10)
59. Plays simple table games (10)

The fifteen items relatively easier for the visually handicapped group as shown by a difference of 5 points or more in rank order of difficulty are as follows:

Self-Help
General (14 items)
8. Sits unsupported (6)
26. Gives up baby carriage (7)
41. Avoids simple hazards (5)
Eating (12 items)
16. Does not drool (6)
30. Discriminates edible substances (6)
Dressing (12 items)
50. Washes hands unaided (9.5)
64. Bathes self assisted (8)
70. Combs or brushes hair (8.5)
74. Bathes self unaided (8)
Locomotion (8 items)
Occupation (11 items)
36. Initiates own play activities (5)
57. Uses skates, sled, wagon (6.5)
72. Does routine household tasks (7)
Communication (9 items)
31. Uses names of familiar objects (5.5)
34. Talks in short sentences (6)
Self-Direction (2 items)
Socialization (9 items)
27. Plays with other children (5)

Examination of the two lists of items shows that there are no Loco-

motion or Self-Direction items in either list. This does not seem particularly significant in the case of the Self-Direction Category, since there are only two such items among the entire 77 items used. However, the lack of any Locomotion items which differ in order of difficulty by as much as 5 points may mean that for these handicapped children the development of locomotion retains about the same relationship to general development as in the case of seeing children.

The largest number of items differing by 5 points or more in rank order of difficulty fall under Occupation, Communication, Eating and Dressing. Three of the Occupation items fall in the relatively easier group, while 4 fall in the relatively more difficult. Two of the latter that is, 19 and 43, would obviously be very difficult for visually handicapped children, if only because the first might often seem to parents a meaningless activity for children with little or no vision, and because the second would impress many as being too dangerous a performance. Two of the Communication items are in the easier list, and 3 in the more difficult. Here again, items 58 and 63 would obviously be difficult for the visually handicapped. In comparing the eating items, it will be noticed that those on the relatively more difficult list require more activity and manipulation than those on the easier list. On the whole, the dressing items seem to be relatively easier for the handicapped group. This is particularly true of the later dressing items.

This study of the relatively easier items revealed a tendency for the visually handicapped, other things being equal, to succeed more frequently on items requiring less initiative, less activity and less aggressiveness. This tendency is somewhat masked by the presence of a few items which require no great initiative but which are especially difficult for the totally blind since the described behaviour has little meaning for them. While the use of hammer and nails was allowed in some instances for 43, the fashioning of objects in clay for 55, the printing of words in braille for 58, and the more advanced use of braille for 63, the substitutions have not been standardized and on the whole are probably more difficult than are the original items for seeing children.

It should be pointed out that item 27 does not require any great initiative or cooperation on the part of the child but merely that he play in the presence of other children without making trouble. As for item 36 some initiative would seem to be required, but experience with blind children of this age indicates that a study of their play behavior would show it to be characterized by relatively less activity than that of seeing children. This would probably be less true of the partially seeing.

Item 57 is definitely an activity item. However, the items it displaces require considerable manipulative skill, the understanding of spatial relationships, the definite use of vision, or an even greater degree of activity.

On surveying the items which were relatively more difficult for the handicapped group there are a few items such as 19, 58 and 63, which may be passed over quickly as being obviously very difficult for the visually handicapped. Items 28, 33, 38, 43 and 47 all require rather delicate manipulation and while they can be carried out without the use of vision, visual perception would greatly simplify the comprehension of the

relationship involved in addition to serving as a guide to successful performance. The behavior of the visually handicapped group as measured by these items as well as by items 22 and 24 may indicate the extreme difficulty with which the blind child is able to grasp the significance of spatial relationships, particularly when those relationships are further complicated by use of external objects. For example, it is easier for the small visually handicapped child to find his way about the house and yard than to manipulate a spoon successfully. Experience has shown that it is extremely difficult for a blind child to learn to scoop up food with a spoon. He can carry the food to his mouth when once the spoon is loaded long before he can learn to do the scooping himself. This is probably because it is very difficult to comprehend, without the use of vision, what goes on at the end of the spoon and the relationship of his hand movements to this end-of-the-spoon activity.

The presence of item 10 in the list of the relatively more difficult would seem to indicate that the visually handicapped child is particularly retarded at this early stage in his linguistic development. Early retardation in the use of language has often been observed by those working with small blind children. However, later linguistic items such as 31, 34, and 44 were relatively easier for this group of handicapped children than for the normal seeing children. This, of course, is not to imply that the blind or partially seeing child is actually as well advanced with regard to these items as is the normal seeing child, but merely that he is less retarded on them than on some others.

As item 4 is worded it represents a type of behavior which is probably meaningless for the totally blind child. He may, and often does, show a desire to be taken up, by whimpering and wriggling, but he will seldom if ever indicate this desire by reaching out. Such signs of recognition as whimpering and wriggling should be given credit, according to the Manual. However it is much more difficult for the seeing adult to interpret such behavior on the part of the blind baby than to interpret the reaching out of a seeing child. It may seem strange, at first thought, that it should be easier for these children to reach for nearby objects than for familiar persons. However, the blind child can learn to find objects by feeling along the surface of the bed or floor, or the sides of his crib, and this is very probably a more meaningful performance than is reaching into air for a person to pick him up, especially since he cannot see the response of the person.

An effort was made to discover the effect of differences in mental abilities by comparing the data for the retarded with those for the superior children. These results are presented in the longer article. They were difficult to interpret due to the fact that 50 per cent of the superior group were partially seeing while only 29 per cent of the retarded group were partially seeing. However, they seem to be in line with those obtained by Doll who found that in comparing the results for normal and feebleminded subjects the Scale was quite consistent as to the progression of items with regard to difficulty (6).

2. The blind versus the partially seeing preschool child. Although there were 46 blind and 46 partially seeing children in Group I, the blind were, on the average, considerably younger than the partially seeing. Consequently, a matched group of 28 blind and 28 partially

seeing subjects were chosen from among those in Group I for closer study. The children were matched for age and as nearly as possible for intelligence. By using the matched pairs it was possible to get a measure of actual difficulty as well as of relative difficulty on the various items for the two groups.

The blind and the partially seeing were closely matched in age since the average age in each case was 4.07 and there were the same number of children at each age level. Table 4, not included here, shows the number of subjects at each age level for the matched groups. The two groups could not be matched as closely for mental level since, as pointed out above, no quantitative measure could be used. However, in each case a child in one group classified as retarded was matched with one of approximately the same age who was classified as retarded in the other group. The same was done with those classified as normal and superior.

Various characteristics of the matched groups are shown in Table 5. The subjects were matched for sex wherever possible, but this could not be carried through completely. It is probable that the discrepancies here were not highly important, since Bradway states that "no item of the revised scale shows a significant sex difference" (1). The blind group is slightly loaded with children having additional handicaps.

Gross data with regard to life age, social age, and social quotient are given in Table 6, which is omitted here. The mean social quotient

TABLE 5

VARIOUS CHARACTERISTICS OF 28 BLIND AND 28 PARTIALLY SEEING MATCHED SUBJECTS

Groups	Total	Boys	Girls	Colored	Additional Handicaps	Prematurity	Serious Illnesses	Progressive Visual Loss	Improved Vision	Visual Defect Noticed Within: 2 weeks	1 year	2 years	3 years	5 years	Unknown
Total Group 1-0 to 6-11															
Part.Seeing	28	15	13	2	2	0	9	0	10	17	7	1	0	0	3
Blind	28	21	7	3	5	2	12	0	2	12	8	0	3	1	4
Younger Group 1-0 to 3-11															
Part.Seeing	13	7	6	0	2	0	6	0	5	8	4	0	0	0	1
Blind	13	7	6	0	3	2	7	0	2	6	4	0	1	0	2
Older Group 4-0 to 6-11															
Part.Seeing	15	8	7	2	0	0	3	0	5	9	3	1	0	0	2
Blind	15	14	1	3	2	0	5	0	0	6	4	0	2	1	2

for the partially seeing is higher than that for the blind. The difference is not statistically reliable, since the groups are small and the variabilities great. Nevertheless, it probably represents a real difference, since it is fairly large, and, in accord with observation, it favors the partially seeing.

A comparative analysis was made of the scores for the blind and the partially seeing on each item in the series from 1 to 77. The comparison was made, first, by a count of the number passing each item and, second, by arranging the items in rank order of difficulty for the blind and for the partially seeing separately. By the first method it was possible to compare the actual difficulty of each item for the two groups. For example, item 31 (Uses names of familiar objects) was passed by 21 of the blind and by 25 of the partially seeing children, showing that this item was more difficult for the blind.

The comparisons of the items at the ends of the series do not actually differentiate the two groups, since the early items are too easy and those at the other extreme too hard. The last two items, as well as items 66 and 73 were failed by all of the subjects.

Although 15 items showed identical scores for the blind and the partially seeing, 4 of these were zero scores and 7 were perfect ones, leaving only 4 which give any measure of comparative difficulty. Twenty-one items showed higher scores (were easier) for the blind children, 19 of them differing from the corresponding scores for the seeing by 0.5 to 2.5 points, and two differing by from 3.0 to 4.5 points. Forty-one showed higher scores for the partially seeing, 27 of them differing from the corresponding scores for the blind by from 0.5 to 2.5 points, 13 differing by from 3.0 to 4.5 points, and 1 by 5 points. Obviously, many of these differences are slight and with a larger number of subjects might be considerably changed.

A detailed study presented in the complete manuscript indicates that the blind children tended to excel in items which require less initiative and less out-going behavior.

The comparison was made on the basis of actual difficulty of the individual items. It is also of interest to determine whether there is a difference between the blind and the partially seeing as to the order of difficulty of the various items. For this reason, a second comparison was made of the paired groups by arranging the items in the order of difficulty as they occured first for the blind and then for the partially seeing, noting those items which showed large differences in relative difficulty. There were 21 items beyond the 0-1 year level which showed a difference of 5 points or more in rank order of difficulty for the two groups of children. Thirteen of these were relatively easier for the partially seeing and 8 for the blind.

All the items that were <u>relatively</u> easier for the blind were found to be included in the previous list of items which were <u>actually</u> easier for them. The same thing holds true for all in the lists for the partially seeing with the exception of two items, Numbers 21 and 29. These two were actually easier for the partially seeing but did not appear in the former list because they differed by less than the three points necessary for inclusion. In other words, the items listed here are both <u>actually</u> and <u>relatively</u> easier for the children.

The results suggest that the blind children in this study tend to be more docile, have less initiative, are less active and outgoing, are more introverted, and possibly more cooperative than the partially seeing children. It is to be noted also that, on the whole, the differences found to exist between the blind and the partially seeing children follow the pattern of behavior which appeared in the comparative study of the total visually handicapped group and the normal seeing children as shown by the Scale.

As an additional check on this, the larger groups of 46 partially seeing and 46 blind children were compared as to rank order of difficulty for each item, in order to see whether or not the results would be consistent with those found for the matched groups. In each case the difference was in the same direction as for the matched groups. Furthermore, there were only 5 additional items upon which the larger groups differed by more than 5 points in order of difficulty. Three of these, 12, 13, and 14 were below the one-year level and thus were not included in the lists although the scores actually differed by more than 5 points. The other two, items 52 and 63, showed differences of only 4 points and so were not included in the lists.

A comparison of the data in Tables 3 and 6 (which are not presented here) showed that the larger groups differed considerably more in mean social quotient than did the matched groups. The means for the larger groups were 91.17 for the partially seeing and 75.91 for the blind, making a difference of 15.26. For the matched groups, the means for the partially seeing were 87.71 and for the blind 80.21, making a difference of 7.50. However, a larger difference is to be expected with a larger and unmatched group.

It appears, then, that the results found for the larger groups were fairly consistent with those found for the matched groups. Both sets of data indicate that, on the average, the blind preschool child does differ from the partially seeing in certain respects.

The question next arises, if the blind and partially seeing differ from each other on certain items, do they differ from the normal seeing child on the same items and in the same way? The order of difficulty of the 77 items for the 46 blind children was compared with that of the Scale and, likewise, the order of difficulty for the 46 partially seeing children was similarly compared, in order to see whether the differences for the two handicapped groups occurred on the same items and in the same direction.

These comparisons revealed that there were 34 items out of the 77 on which the blind children differed from the Scale as standardized for normal seeing children by 5 points or more in order of difficulty. The partially seeing children differed from the Scale in the same direction on 29 of these items. There were 28 items on which the partially seeing differed from the Scale by 5 points or more in order of difficulty. The blind differed in the same direction on 26 of these. The two groups differed from the Scale by 5 points or more in opposite directions on only one item (Number 49).

It appears, then, that with few exceptions those items which were relatively more difficult for the blind were also relatively more difficult for the partially seeing. In other words, the differences in

behavior so far as they are measured by this test are largely differences in degree.

3. Tentative age norms for visually handicapped preschool children. The evidence suggests that separate standardization might well be made for the blind and partially seeing, but the present data are quite insufficient for this. However in view of the fact that for the most part the blind and the partially seeing tend to differ from the normal on the same items and in the same direction, and in view of the fact that both groups show extreme variability, it seemed worth while to use the total group of 92 subjects for the purpose of working out tentative norms for the visually handicapped, regardless of degree of sight, on each of the items upon which there was a usable amount of data. This meant that it was necessary to have a fair number of cases at each age level down to the age where one could be reasonably sure that the next lower age level would bring approximately 100 per cent of passes and up to that age where one could be reasonably sure that the next age level would bring approximately 100 per cent of failures.

The Thompson method of calibration was used here, as in the original standardization of the Scale (6). Age norms were found for 32 items, as shown in Table 7. In each case it seemed reasonably certain that approximately 100 per cent of the visually handicapped children below the age of one year would fail and that approximately 100 per cent above 7 years would pass the item. It will be noticed that no item below 15 and none above 52 was used. Furthermore, some of the intervening items were omitted because the available data concerning them did not meet the criteria. It should be emphasized that these age norms are extremely tentative because of the relatively small number of children at certain age levels and because of the unequal distribution of the blind and partially seeing at the different age levels. The 2-3 year level was particularly inadequate with only 9 subjects, of whom all were blind except one. Any age norms for visually handicapped children should be used with great caution because of the amount of diversity among the children and the limited numbers available at a given age level for standardizing purposes. They have been presented here in the hope that they may furnish the incentive for further study and the development of more accurate norms.

B. Longitudinal Results

Among the children whose records were used in the preceding section, there were 31 upon whom 3 or more recordings had been made at approximately 3-month intervals. In order to obtain a further check on the value of the Scale as a developmental measure, these 31 subjects were used for a longitudinal study. Since there were only 3 recordings for some of these children and an uneven number for the others, only 3 recordings were used for each of them. Because of the small number of subjects this longitudinal study did not prove to be sufficiently enlightening to warrant publication of the results in this article.

However, on the whole, it can be said that while individual items did reflect progress on the successive recordings, they varied considerably from item to item as to the amount and consistency of progress shown. An adequate longitudinal study of this type would require a much

TABLE 7

TENTATIVE AGE NORMS FOR THIRTY-TWO ITEMS AS FOUND FOR VISUALLY HANDICAPPED PRESCHOOL CHILDREN

Scale Age Level	Item Number	Age Norm Handicapped	Scale Age Level	Item Number	Age Norm Handicapped
0 - 1	15	1.8	2 - 3	35	3.1
				36	2.7
1 - 2	18	2.0		37	3.2
	21	2.0		38	4.5
	22	2.6		39	4.1
	24	2.8		40	3.6
	25	2.4		41	3.0
	26	1.9		42	4.3
	27	2.0		44	3.8
	28	2.9			
	29	2.2	3 - 4	45	3.9
	30	2.2		46	4.3
	31	2.3		47	4.7
	32	2.5		48	4.3
	33	3.5		49	4.6
	34	2.5		50	3.8
			4 - 5	51	4.7
				52	4.5

larger number of subjects studied over a longer period of time with preferably separate treatment of the data for the blind and the partially seeing.

II. Case Histories for Seventeen Children

The full report gives the detailed case histories of 17 children for whom ample data were available. This material not only furnished considerable information with regard to each child's behavior but also concerning factors relating to his health and to various situations causing emotional disturbances. Such records, made by teachers, nurses, and trained observers over a period of time, served as a valuable criterion of the validity of the scores on the Vineland Social Maturity Scale taken over the same period.

The 17 case histories which were presented in the full report showed in general very close agreement between the behavior notes and the trends indicated by the Social Maturity scores. This is especially noteworthy since the cases covered a wide range in general behavior level and variations in developmental trends from rapid progress to actual retrogression.

A number of factors appear to have affected the level of the SQ. Among the most important seemed to be health, specialized training, and general environment. Improved vision appeared to be an important factor in two cases and of possible significance in two others. Deep seated emotional disturbances appeared to play definite roles in lowering the SQ at specific periods in the development of three cases.

However, the general tendency for the SQ to rise during the child's stay at the Home would seem to indicate that training is an important factor in the Social Maturity of the visually handicapped child as measured by the Vineland Social Maturity Scale. This increase in SQ occurred in all except the very low grade cases and that of one child whose SQ dropped 17 points over a period of approximately 6 months due to a serious eye condition. In some cases this improvement was attributed, in part, to improved health or improved vision or both, but in others there was little change in health or vision. Dr. Doll suggests the possibility that the improvement in SQ of the various children may have been due to delayed development owing to lack of vision. There is little doubt that this may have been a factor in certain instances. However, it seems likely in the cases studied that much of this delay in development could have been avoided by special training at an earlier period in the life of the child.

Some of the children showed definite limitations and thus a tendency for the SQ curve to level off even under continued intensive training. No doubt this would have been true in all cases if the training had continued long enough. In the very low-grade cases there was a tendency toward retrogression after a long period of intensive training. This retrogression on the part of the very retarded subjects may indicate that the intensive training was too great a strain and finally proved to have a disintegrating effect.

It would be impossible to say to what extent a given SQ is dependent upon natural ability and to what extent it is dependent upon training. It seems a fair assumption that the visually handicapped child is much more dependent upon training than is the seeing child. The ordinary environment and the usual methods of training are far more adequate and stimulating to the seeing than to the blind baby. Consequently the blind baby is likely to sink into a kind of vegetative state if no special effort is made to arouse his interest in his environment. This is somewhat true, but to a much less degree, of the partially seeing infant.

III. Further Evaluation of Individual Items

In the full report there is an exhaustive analysis of each item in terms of its probable fairness to blind and low visioned children under school age. Much of this analysis is based on the experience which the investigators have acquired as a result of working not only with the children in this study but with others in their own homes over a period of years. Constant reference was made to data accumulated by the present investigation.

The necessity for this evaluation lay in the need for working out a tentative adaption of the Vineland Social Maturity Scale for use with these children. There were two somewhat different objectives in attempting to revise the Scale. It was hoped that a scale might be evolved which would be adequate both for the comparison of the visually handicapped with the seeing in regard to social competence and for comparison of the visually handicapped among themselves. It is conceivable that a scale might be admirably adapted to the one and yet quite inadequate to the other use. Only the summaries presented for each year-group of

items to years VII - VIII are given here.

O-I

With few exceptions the items below the one-year level appear to be useful for measuring the development of visually handicapped children. The chief difficulty found in the practical application of this part of the Scale is that the steps are too large. Visually handicapped babies make less rapid progress at this stage and there are definite in-between stages of progress particularly in motor development which appear to be more significant for the visually handicapped than for the normal seeing infant. Specific suggestions along this line will be made in the section on suggested revisions of the Scale.

I-II

All the items at the one-to-two year level have been found to be useful for work with the visually handicapped except 19, 26, 27, and 30. Some of the other items need redefining or splitting up into two separate items, and some in-between steps should be added.

II-III

Two of the items at this age level, 41 and 43, are of doubtful value for use with visually handicapped children. Forty-one might be useful if redefined and another item added. Both items 36 and 38 need redefining and at least one Dressing item should be added.

III-IV

Five of the 6 items at this age level have been found useful. Two, 45 and 47, were found to have definite limitations and one item, 46, needed rewording and redefining.

IV-V

It has been found that one item, 53, needs redefining and that two items, 55 and 56, penalize the visually handicapped children too severely without offering an adequate measure of their progress. Other items should be added which would measure the development of these children in Occupation and Socialization.

V-VI

With the possible exception of Item 57, the items at the 5-to 6-year level have been practically useless for measuring the development of this group of visually handicapped children.

VI-VII

Two (62 and 64) of the items at this age level appear to be useful

and the other two, 63 and 65, inadequate for use with the visually handicapped.

No adaption is attempted beyond the year-group V-VI.

The following paragraphs discuss more specific revision which might improve the usefulness of the Scale for work with visually handicapped children. It is likely that some of the difficulties encountered in the use of the Scale with the visually handicapped have also been experienced in its use with the seeing. No doubt the revision of the Scale upon which Doctor Doll is now working will resolve many of these difficulties.

The Scale as presented here is in extremely tentative form and is set up with the hope that it may be used in the near future with a sufficient number of visually handicapped children so that it can be put into more permanent form. It cannot be too strongly emphasized that none of the revisions of original items and none of the new items have been even tentatively standardized on visually handicapped children. That would require another extended project. In other words, the revision is merely ready to be tried out.

The need for certain types of revision for use with visually handicapped preschool children has been revealed by the quantitative data and by the experience of those working with the Scale in connection with visually handicapped children. It should be pointed out that the increase in number of items representing smaller steps in development, and tapping a somewhat greater variety of behavior areas, may in the end yield only negligibly different total scores and yet may prove invaluable for diagnostic purposes. The suggested revisions have come in part from the study of seeing children by Gesell et al. (9). Others have come from an infant schedule mentioned in an earlier article (8) which was used for three or four years in the Arthur Home and revised a number of times according to need. Still others were based upon the more general observation and experience of those working with the Scale.

No attempt has been made to revise the order of the original items on the basis of order of difficulty found for the 92 visually handicapped children constituting the principal group in this study. There has been no attempt at revision beyond the 5 to 6-year level, since little material was available beyond that point.

The general organization as to categories and age levels of the original Scale has been adhered to. The items have been numbered consecutively throughout, with a letter following to indicate the category to which each item belongs. The various categories are designated as follows:

Self Help:	General - G	Locomotion	- L	Self-Direction	- S-D
	Eating - E	Occupation	- O	Socialization	- S
	Dressing - D	Communication	- C		

The letters and numbers in parenthesis preceding the items should be interpreted as follows: (N) indicates that the item is new, in that it does not appear in the original Scale; a number followed by the letter R, as (6R) indicates that the item does occur in the original Scale but has been revised in some way either as to definition or wording, or has been otherwise changed; a number alone, as (15) indicates that the item has been used without modification. The description and definition of the items have been included in all cases of new and redefined items.

THE VINELAND SOCIAL MATURITY SCALE AS TENTATIVELY REVISED
FOR USE WITH VISUALLY HANDICAPPED PRESCHOOL CHILDREN

0 - I

(N) 1/G. Turns head from side to side.
Turns head from side to side when in prone position.

(1) 2/C. "Crows"; laughs.

(2) 3/G. Balances head.

(N) 4/G. Grasps objects upon contact.
Will grasp and hold small objects when they come in contact with his hand.

(3) 5/G. Grasps objects within reach.

(4R) 6/S. Responds to human beings.
Responds to presence of nurse or parents by wriggling, gurgling or otherwise showing desire for being picked up and pleasure at being held or cuddled.

(5) 7/G. Rolls over.

(N) 8/G. Attempts to regain lost objects.
Makes definite effort to reach out for desired objects which have slipped from grasp but which are still in contact.

(6R) 9/G. Reaches for nearby objects.
Attempts to obtain objects which are slightly beyond reach, of which he is aware through some sensory stimulation-visual, auditory, olfactory or tactual-kinaesthetic (vibration).

(N) 10/0. Accepts objects when offered.
Will take and hold object for short time when it is placed in hand.

(7R) 11/0. Occupies self unattended.
*a. Plays with objects three or more minutes.
Bangs, shakes, feels or otherwise plays with object more than momentarily.

b. Amuses self with one or more objects for periods as long as 15 minutes.

(N) 12/0. Shows some choice of objects.
Shows preference in toys. Plays more consistently with some than with others. May show pleasure when given some toys and indifference toward or rejection of others.

(8R) 13/G. Sits unsupported with back straight.
a. Ten seconds or more. Sits voluntarily with back straight on firm flat surface without support, for 10 seconds or more.
b. Several minutes.
Same as a. except for extended time.

(9R) 14/G. Pulls self to standing position.
a. Makes definite attempt. Pulls self to standing position when adult is assisting by holding under arms, to both hands, or to clothing, etc.
b. Holding to crib or other object. Comes to standing position by holding to some object (not a person).

*In each case where an item has been divided into two parts it is assumed that each could carry the weight of one-half point. However, this would necessarily be determined by data obtained when the revised scale was tried out.

(N) 15/G. Lowers self from standing to sitting position.
Comes to sitting from standing position without falling and without assistance from another person. May help self by holding to objects.

(10) 16/C. "Talks"; imitates sounds.

(11R) 17/E. Drinks from cup or glass assisted.
a. Adult holding glass.
Accepts liquid from glass rather than bottle. Glass may be held entirely by adult but infant is able to drink from it without much spilling.
b. Helps to hold glass.
The child holds glass but cannot be depended upon to retain his grasp.

(12R) 18/L. Moves about on floor.
Moves about in one fashion or another, creeping, pulling himself about in sitting position or even sliding around in an almost prone position or hitching along in a backward direction.

(13) 19/G. Grasps with thumb and finger.

(N) 20/G. Releases objects.
a. Releases with contact.
Is able to transfer small object from one hand to the other or to release it against a resisting surface as a table top or floor.
b. Drops objects voluntarily.
Can voluntarily release object in mid-air without touching any surface.

(14) 21/S. Demands personal attention.

(N) 22/L. Walks sideways when holding to pen or furniture.
Takes steps sideways without assistance of person but holding on to crib, pen, wall, furniture, etc.

(N) 23/L. Walks assisted.
a. Walks forward when held by both hands.
Takes steps forward when assisted by person holding both hands or given support on both sides. Child holds much of his own weight but does not balance.
b. Walks with slight assistance.
Has almost attained balance and independent control but is unable to go alone either through lack of confidence or actual physical inability. May be helped by adult holding one hand, by harness fastened about the waist having reins which may be held lightly by adult. Sometimes merely holding the child slightly by the clothing at the back of the neck will give him confidence. Any method might be used which gave only slight physical support but which would serve to give confidence to the child.

(15) 24/G. Stands alone.

(16) 25/E. Does not drool.

(17R) 26/C. Follows simple instructions.
a. Inhibits on command.
Will inhibit certain simple acts upon simple familiar command.
b. Makes positive response to command.
Can perform simple pantomime like pat-a-cake, hand a toy, shake a rattle, or come to a person on command.

I - II

(18R) 27/L. Walks alone.
a. Few steps.
Takes a few steps (four or more) unassisted and unsupported by person or object.
b. Across room.
Walks without assistance or support approximately the distance of the width of an ordinary room.

(N) 28/0. Examines objects with interest.
Begins to show curiosity about objects in his environment as demonstrated by fairly intent examination either by feeling, tasting or "trying out" in various ways.

(N) 29/0. Responds to sounds.
Makes definite response to various sounds such as bells, whistle, etc.

(N) 30/0. Manipulates objects.
Works movable parts of objects, as hinged box top, a toy with movable parts, removable lid on a box or can.

(N) 31/D. Cooperates in dressing.
Finds large arm-holes and in general cooperates in dressing.

(20) 32/E. Masticates food.

(N) 33/D. Removes mittens and cap.
Is able to remove mittens and cap when unfastened and not too tight. Does so as an act of undressing and not just in play.

(21R) 34/D. Pulls off socks or shoes.
Removes socks or shoes when unfastened if not too tight. Does so as an act of undressing and not merely in play.

(22R) 35/0. Transfers objects.
a. Places objects.
Picks up and puts down objects definitely rather than merely dropping them.
b. Arranges objects.
Arranges objects with relation to each other. May be somewhat disorganized piles or groups. Carries objects around. May use push or pull toys.

(N) 36/0. Responds to music.
Makes general body response to rhythm. May hum or sing.

(23R) 37/G. Solves problems.
a. Overcomes very simple obstacles.
Can push small chairs or other small objects out of the way, back walker or kiddie-kar, when he runs into large object, or solve other simple problems.
b. Uses intermediary objects.
Climbs on stools, chairs or boxes to reach; uses stick as implement, etc.

(23R) 38/G. Uses receptacle for carrying.
Uses basket or other receptacle for carrying small objects from one place to another, or for transporting sand or water.

(24R) 39/0. Fetches or carries familiar objects.
a. Across room.
Will carry familiar object across room from one person to another if object is in hand.

b. From one room to another.
Will carry familiar object from one person in one room to person in another familiar room.

(25R) 40/E. Drinks from cup or glass.
a. Holds glass with supervision.
Can hold glass while drinking but may drop it instead of replacing it on table.
b. Holds cup unassisted.
Handles cup or glass well and can replace on table.

(27R) 41/S. Plays with other children.
Parallel play but obviously enjoys being with other children. Only slight give and take. Some attempt to defend own rights. May be considerable snatch and grab.

(28R) 42/E. Eats with spoon.
a. Assisted.
Shows definite attempt to feed self but food may be put on spoon and help given in guiding spoon to mouth.
b. Unassisted.
Uses spoon without help and with moderate spilling.

(29R) 43/L. Goes about house or yard.
a. Holding to walls or other objects.
Independent of other people; may cling to objects for security and finding way about, but goes about house or yard alone. May have to be watched from a distance to assure his keeping out of mischief or danger.
b. Walks about freely.
Walks about freely in house and yard with only occasional use of objects as guides.

(N) 44/C. Says two or more words.
Must be words which have definite meaning for the child.

(N) 45/C. Indicates needs or desires through language and gesture.
Indicates some needs or desires such as food, toilet or drink through the use of language and gesture.

(31) 46/C. Uses names of familiar objects.

(32R) 47/L. Walks upstairs.
a. Assisted.
May require considerable encouragement and be physically helped by holding one hand, or dress or by slight boost on the buttocks, but child holds rail and definitely attempts to step and pull himself up in upright position.
b. Unassisted.
May be accompanied and encouraged but not physically helped. May hold to rail.

(32R) 48/L. Walks upstairs unaccompanied.
Walks upstairs "on his own." Must walk, not creep. May hold to rail.

(34) 49/C. Talks in short sentences.

II - III

(N) 50/D. Helps with panties.
Makes definite effort to pull up or push down panties, if not fastened, as an act of undressing or when going to the toilet.

(35) 51/G. Asks to go to toilet.

(36R) 52/0. Initiates own play activities.
Handles objects, exploring and examining them. Carries objects such as blocks around in containers, transports them in wagons and dumps them out. More prolonged and organized play than items 35 or 38. Plays very simply with dolls and teddy bear.

(N) 53/0. Interested in tactual qualities.
Touches and feels objects of various textures, exploratively, like fur, velvet, satin, etc.

(N) 54/0. Carries out constructive activity (substitute for 43). Manipulates materials such as clay, bread dough, mud-pounding, rolling, poking and pulling pieces off. Uses peg board putting large pegs in without help. Uses hammer and large headed nails, hammering nails into soft surfaces.

(N) 55/S. Attends to stories.
Will listen attentively to short simple stories which have repetition and which have familiar characters.

(N) 56/C. Uses pronouns - - I, me, you.
Uses these pronouns with some understanding.

(37R) 57/D. Removes coat or simple garment.
Removes simple garment as coat or dress which opens clear down when unfastened, if not tight or in any way difficult to pull off.

(38R) 58/E. Eats with fork.
May use it much as he uses a spoon but is able to carry food to mouth with only moderate spilling.

(40R) 59/D. Dries own hands.
a. Goes through the motions.
Results not yet acceptable.
b. Acceptably.

(N) 60/C. Uses past tense and plural forms.
Makes correct use of both.

(41R) 61/G. Avoids simple hazards.
(Same as original with following addition) But does not show excessive timidity.

(42R) 62/D. Puts on coat or simple garment.
a. Assisted.
Can put it on if handed it in right position and helped slightly in getting started. Need not fasten.
b. Unassisted.
Same as original 42.

(44) 63/C. Relates experiences.

III - IV

(N) 64/L. Jumps with both feet.
Jumps from low box or off of bottom step with both feet.

(45R) 65/L. Walks downstairs one step per tread.
Walks down without help, placing a given foot on alternate steps. In other words,

does not step down with one foot and then bring the other foot down placing it on the same step.

(46R) 66/S. Cooperative play at pre-school level. Plays in small groups of two or three. Is beginning to cooperate in various ways, as rocking boat, doing things together, willing to wait turn. Plays circle games. Participates with group in rhythms.

(N) 67/D. Unbuttons front and side buttons. Undoes all front and side buttons if not excessively small.

(47R) 68/D. Buttons front and side buttons. Buttons all front and side buttons if relatively large unless buttonholes are too small or buttons are particularly difficult because of shape or for some reason are hard to get at.

(48) 69/O. Helps at little household tasks.

(N) 70/O. Makes "pies", "cakes." Makes forms with some approximation to that of objects represented, as pies, cakes, etc. May use mud, clay, sand, or other medium.

(50) 71/D. Washes hands unaided.

IV - V

(51) 72/G. Cares for self at toilet.

(52) 73/D. Washes face unassisted.

(53R) 74/L. Goes about neighborhood unattended. Goes about immediate neighborhood unsupervised. "Immediate neighborhood" does not necessarily involve the crossing of streets. Knowledge of whereabouts and activities may be required and child may be restricted as to area.

(54) 75/D. Dresses self except tying.

(55R) 76/O. Uses pencil or crayon for drawing. In addition to original definition the following activities should be given credit: The use of clay, mud or other medium to make recognizable forms, or the use of buttons, blocks, pegs or other materials to make well-defined designs.

(N) 77/S. Takes part in dramatic play. Plays singing games, takes part in dramatized songs or stories.

(N) 78/S. Laughs at "funny" situations. Responds to nonsense rhymes and funny stories. May create stories with silly language.

(N) 79/G. Skips. Skips or hops on one foot with some proficiency. Not just one or two hops but across the room. May change from one foot to the other.

V - VI

(57) 80/O. Uses skates, sled, wagon.

(N) 81/S. Well adjusted to leaving familiar persons.
Leaves the home for school or other destination alone or with playmates without difficulty in parting from adult to whom he is emotionally attached.

(N) 82/O. Carries out extended projects.
Is interested in projects which carry over from day to day such as building structures to be used for special purposes as dramatic play. May make objects to be used for special purposes. These enterprises may be carried out alone or in groups. The child may need slight suggestions or supervision from adult but shows definite interest in completing what he starts.

(N) 83/S. Responds to competition.
Competes with other children of approximately same age and in same group.

(N) 84/S. Adjusts to formal situation.
Adjusts readily to group situations and to modern kindergarten regulations which require a certain amount of restraint, routine and conformity to rules. Can go with adult on short shopping tours, to make short calls, etc., without causing any great concern as to behavior.

(N) 85/C. Tells long story accurately.
Is able to tell a fairly long but simple story of two or three episodes which has been read or told to him at home or at school, getting the principal facts correct. If an imaginative child, may add to and change some of the details to suit his own fancy.

(N) 86/C. Asks questions of how and what and meanings of words.
Is interested in how things work, what they are for, and in the meanings of words.

(N) 87/L. Can cross streets.
Is trusted to cross streets alone where there is relatively little traffic. Watches for cars and obeys traffic lights when necessary.

SUMMARY AND CONCLUSION

The chief purpose of this study was to further the development of an adequate scale for measuring the general social competence of visually handicapped preschool children. An attempt was made to ferret out specific types of behavior in which these children tend to be retarded.

The first 77 items of the Vineland Social Maturity Scale, including years from zero through ten, were used as the basis for the study. An intensive study was made of the scores of 101 visually handicapped children ranging in age from 9 months to 6 years and 10 months. The effect of differing degrees of blindness and of intelligence upon the total scores as well as upon the scores of individual items was investigated. Tentative age norms for visually handicapped children were obtained for 32 items, as many as was possible with the existing data.

The validity of the scale was checked against the case histories of 17 visually handicapped preschool children for each of whom a series of Social Maturity recordings had been obtained and for whom there were behavior notes and records of physical conditions and emotional factors.

An evaluation of individual items was made on the basis of all available material, and finally a tentative series of 87 items was suggested as the basis for a new study. Twenty of these were taken from the Vineland Social Maturity Scale without revision, 31 with revision; 36 were new items taken from various sources and from the experience of the investigators with visually handicapped children.

In conclusion, (1) The Vineland Social Maturity Scale was found to have considerable value for work with visually handicapped preschool children: (2) A few items were found to be of little value, and others needed revision for work with these children; (3) There appeared to be a need for additional items representing smaller steps of progress, and also for items tapping other types of behavior; (4) The results definitely indicated that these children, as a group, were retarded on specific items, and (5) These visually handicapped children, on the average, appeared to be more docile, less active, and have less initiative than seeing children of corresponding ages. This behavior pattern was more striking in the blind than in the partially seeing.

The present article is published in the hope that clinicians will be willing to try the two scales with whatever visually handicapped children may come to their attention and that they will then notify the authors of the results. Cooperation in the evaluation of this adaptation will be greatly appreciated. Mimeographed copies of the tentative adaptation may be obtained upon request from Kathryn E. Maxfield, 40 East 61st Street, New York City.

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THE DEVELOPMENTAL STATUS OF SPEECH SOUNDS OF TEN FEEBLE-MINDED CHILDREN

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This report represents the first step in a systematic study of the use of vowel and consonant elements by feeble-minded children. The purpose is to determine developmental trends in the speech of mentally retarded children and to relate data acquired in this field to the processes of development in normal infants and children and to the status of adult speech. Ultimately, information concerning the comparative rates of speech development in normal and feeble-minded children may be established and remedial measures for speech retardation may be set up. A further aim is to try out several indices of speech status on this type of data.

Transcriptions of the speech of a group of twenty-five low-grade feeble-minded children in a state institution were attempted. Unfortunately a sufficient sample of sounds could be secured for only thirteen of these children. A considerable amount of time is necessary to make a transcription on each child and many of them produce sounds only after long intervals. Frequently no vocalization occurs. The work was done during the first week of the year 1941. A second transcription of the sounds of these children was obtained on December 22, 1941. Approximately, then, a year had elapsed between the taking of the two samples. During the year the number had been further reduced by death to ten cases. It is recognized that ten cases do not constitute an adequate sample for sound statistical treatment; nevertheless, there are tendencies in these data which possess at least preliminary meaning, and an elaborate statistical treatment will be postponed pending the accumulation of more cases.

The method of sampling the speech sounds of immature children has been described elsewhere (4). Briefly, it consists of such sounds as occur on a given number of breaths of each subject. In the present study 30 breaths constituted the sample from each child. The vowel sample on the first transcription consisted of 417 elements. On the second transcription it amounted to 560. The total thus is close to 1,000 vowel sounds. On the first transcription 174 consonant elements were included; on the second, 332. The total consonant sounds used by these children thus amounted to about 500. Altogether, about 1,500 separate speech elements are available for analysis.

Transcriptions were taken in the International Phonetic Alphabet as adapted by Fairbanks (1). The problem of the reliability of the observer and of the data in transcriptions of the speech of immature children has been discussed by Irwin and Curry (4), Irwin and Krehbiel (5), and Irwin and Chen (3).

At the beginning of the year these children ranged in age from about

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one to five years with a mean age of three years. All of the children are low-grade feeble-minded cases, idiots and imbeciles. Their IQ's ranged from 7 to 48. The average is 29. Among them are Mongols, hydrocephalics, and unidentified clinical types. Thus clinically they do not constitute a homogeneous group. General information concerning these ten children is tabulated below.

Subject	IQ	Clinical Type	Age Second Transcription Years	Months	Days
1	22	?	3	3	10
2	48	Mongol	2	9	10
3	7	?	4	9	12
4	45	?	5	7	20
5	18	Hydrocephalic	4	10	10
6	39	Hydrocephalic	5	0	5
7	*	Mongol	3	6	17
8	32	?	5	10	23
9	23	?	3	10	0
10	25	?	4	1	7

*Passed only one item on Kuhlmann-Binet. The item is turning the head to source of sound.

The original data are presented in four tables. They will be analyzed in terms of the vowel-consonant ratio, the vowel ratio, and as vowel and consonant dispersions plotted graphically in the form of profiles. Under each of these analyses comparisons will be made with the corresponding indices of the speech status of infants and adults. Table 1 gives the frequency of occurrence of each of eleven vowels for each of the ten subjects. The data for each vowel are arranged in two columns representing the first and the second transcriptions. Table 2 is similarly organized but presents the corresponding per cents of frequency in two columns for each subject. Tables 3 and 4 present frequencies and per cents of frequencies of consonant elements in a manner comparable to that of Tables 1 and 2 for vowels.

These tables furnish the basic data from which the tabulations and analyses of the speech sounds of the feeble-minded children are derived. The comparative data on speech sounds of infants are from studies done by the writer and his associates. The data on adult speech sounds status are from Voelker (6).

The first matter of interest is the question: Do any of these children use meaningful language? Of the ten cases only one (Number 4), a boy of five and one-half years, exhibited meaningful speech patterns, and these consisted only of mutilations and approximations. Of the 30 breath samples of his sounds transcribed at the beginning of the year, 10 were meaningful patterns and 20 were meaningless. At the end of the year 15 of the 30 samples were meaningful. Thus he increased his use of meaningful approximations during the course of the year from one-third to one-half. None of the other subjects of this group exhibited the slightest tendency toward meaningful expression. Thus the bulk of this report concerns sounds characteristic of the premeaning stages of speech devel-

TABLE 1

FREQUENCY OF VOWELS

Subject	i*	i**	I		e		ɛ		æ		ʌ		ɑ		ɔ		o		ʊ		u	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1	1	1	19	20			8	2	12	23	7		1						1	9	1	1
2		1	5	4			17	26		1	22	12		7					8		12	9
3	3	8	17	18	2	1	26	22	1		6	14								4	1	
4	4	11	9	21	2	4	2	7	1	2	6	15	1	7		2	11	7	11	16	4	2
5	1		16	27			4	11			2	17		5					7	5		1
6	1		9	28	4		18	8	1		1	1							6		3	
7	2	1	14	17			4	14	5		2	14										
8	1	3	11	14	2		20	15				4		3					4	2	5	
9	2		4	7			10	10			8	14				1		2	4	6		
10		3	4	24			6	22			6	8		1								
Total	15	28	108	180	10	5	124	157	20	26	60	99	2	23	0	3	11	13	45	43	22	3

*Indicates first transcript

**Indicates second transcript made one year later

TABLE 2

PER CENT OF FREQUENCY OF VOWELS

Subject	i*	i**	I		e		ɛ		æ		ʌ		ɑ		ɔ		o		ʊ		u	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1	2	2	52	41			14	5	21	48	12		2				2	16	2	2		
2		2	10	5			40	34		2	50	16	9				4		16			12
3	5	12	29	28	3	2	44	34	2		10	22						7	2			
4	8	11	18	21	4	4	4	7	2	2	12	16	2	7		4	21	7	21	17	8	4
5	3		52	41			14	17			7	26		7					24	7		2
6	2		21	75	10		42	22	2		2	3							14		7	
7	7	2	52	38			15	30	19		7	30										
8	2	7	21	34	4		55	37				10		7					8	5	10	
9	8		14	18			35	25			29	35				2		5	14	15		
10		5	24	41			38	38			38	14		2								

* Indicates first transcript

**Indicates second transcript made one year later

opment and in this respect resembles the speech of infants under twelve months of age.

The data assembled in the tables furnish answers to the question: How many of the vowel and consonant elements appearing in adult English speech do these feeble-minded children use? The following tabulation gives the number of subjects using each vowel sound.

Vowels	i	I	e	ɛ	æ	ʌ	ɑ	ɔ	o	ʊ	u
Number of Subjects Using Vowel Sound	8	10	4	10	5	10	6	2	4	8	6

It may be seen that all ten use the sounds I, ɛ, and ʌ. The range is from 2 to 10. It is apparent from the tabulation that fewer of these feeble-minded children use back vowels than front vowels.

There are in adult English speech approximately thirteen vowel sounds (broad transcription). These feeble-minded children have not mastered the use of all of them. The matter is explicated in the next tabulation.

TABLE 3

FREQUENCY OF CONSONANTS

Subject	p 1*	p 2**	b 1	b 2	m 1	m 2	w 1	w 2	ʍ 1	ʍ 2	f 1	f 2	v 1	v 2	θ 1	θ 2	ð 1	ð 2	t 1	t 2	d 1	d 2	n 1	n 2
1				3		13		2												3		13	17	3	24
2					1														1		14			3
3					1		3	3	6														2	
4	3	5	1	3		4			2			1		3			1		5	10	2	8		4
5			2	13														3		2		14		
6						1																		
7						8																	4	
8						5	5														1	4		5
9						6																1		
10																							3	4
Total	3	5	6	18	13	29	8	9				1		3			1	3	8	13	30	44	12	40

Subject	ʃ 1	ʃ 2	ʒ 1	ʒ 2	l 1	l 2	ɹ 1	ɹ 2	j 1	j 2	k 1	k 2	g 1	g 2	ŋ 1	ŋ 2	h 1	h 2	ʔ 1	ʔ 2
1														1				1		2
2					3									5			2	3		1
3									2	2		5		2			6	3		
4	2	5		2	1	4		2			11	7	3	4			4	9		
5		8								10							22	1		
6													2				12	14		1
7				1													11	3		6
8				1											1		5	20		
9																	2	7	3	1
10										2								22		12
Total	2	13		5	2	1		4	4	2	2	14	11	12	5	12	1	84	80	3	23

* Indicates first transcript

**Indicates second transcript made one year later

TABLE 4

PER CENT OF FREQUENCY OF CONSONANTS

Subject	p 1*	p 2**	b 1	b 2	m 1	m 2	w 1	w 2	ʍ 1	ʍ 2	f 1	f 2	v 1	v 2	θ 1	θ 2	ð 1	ð 2	t 1	t 2	d 1	d 2	n 1	n 2
1				9	37	4														9		36	37	9	31
2				2				19														33	29		8
3				4		12	27	25																	8
4	9	6	3	4		6		5				1					1		15	14	6	11		6
5			9	24										4				6		4		25		
6						6																		
7						36																		18
8						14	45														10	11		14
9						40																6		
10																							100	10

Subject	ʃ 1	ʃ 2	ʒ 1	ʒ 2	l 1	l 2	ɹ 1	ɹ 2	j 1	j 2	k 1	k 2	g 1	g 2	ŋ 1	ŋ 2	h 1	h 2	ʔ 1	ʔ 2
1														2			2			4
2						6								14			66	8		2
3									18	8		23		8			55	12		
4	6	6		6	1	3	6	3			33	10	9	6			13	12		
5		14								18							81	4		
6													14				86	88		8
7				5													100	14		28
8				5												3	45	55		
9																	40	48	60	6
10										5								55		30

* Indicates first transcript

**Indicates second transcript made one year later

Subject Number	1	2	3	4	5	6	7	8	9	10	Average
Number of Vowels	9	9	8	11	7	8	5	8	7	5	7.7

Subject 4 uses 11 of the full number of vowels. He is the child whose speech exhibits a degree of meaningful patterning. The fewest number of vowel sounds used by any of these cases is 5. The average for

the group is 7.7 vowels.

In adult speech about 24 consonant sounds occur. In the following tabulation may be seen how many feeble-minded subjects use each of them.

Consonants	p	b	m	w	ʍ	f	v	θ	ð	t	d	n
Number of Subjects Using Consonant Sound	1	5	7	4	0	1	1	0	2	3	6	7

Consonants	s	z	ʃ	ʒ	l	r	j	k	g	ŋ	h	ʔ
Number of Subjects Using Consonant Sound	2	3	1	0	2	1	3	2	5	1	10	6

The range is from 0 to 10. Three of the consonants are not used by any of the children. These are ʍ, θ, and ʒ. The sound h is used by all.

The number of consonants articulated by each of the ten subjects appears below.

Subject Number	1	2	3	4	5	6	7	8	9	10	Average
Number of Consonants	8	9	9	17	8	4	5	7	4	4	7.5

Again Subject 4 leads with 17 consonants in his repertoire. The range is from 4 to 17 consonants. The average for the group is 7.5.

The vowel-consonant ratio may be taken as a convenient index of developmental status of speech. Since there are about 13 vowels to 24 consonants in adult speech, the vowel-consonant ratio for mature speech is 1 to 2. The next tabulation includes vowel-consonant ratios for each of the ten children and for the group as a whole.

Subject Number	1	2	3	4	5	6	7	8	9	10	Group	
$\frac{V}{C}$ =	$\frac{9}{8}$	$\frac{9}{9}$	$\frac{8}{9}$	$\frac{11}{17}$	$\frac{7}{8}$	$\frac{8}{4}$	$\frac{5}{5}$	$\frac{8}{7}$	$\frac{7}{4}$	$\frac{5}{4}$	$\frac{7.7}{7.5}$	or 1

Of the ten cases only three have vowel-consonant ratios less than 1, two have ratios of 1, and five are greater than 1. None of the ten shows the mature ratio of 1 to 2. For the group as a whole the vowel-consonant ratio is 1.

The following tabulation gives the vowel-consonant ratio for newborn infants, for the ten feeble-minded cases, and for mature speech.

	Vowels average	Consonants average	Ratio
Newborns	2.7	2.2	3 to 2
Feeble-minded (Mean age = 4 years)	7.7	7.5	1 to 1
Adults	13.0	24.0	1 to 2

Another suggestive index of speech development is the vowel ratio. It is based on the relation of the per cent of frequency of front vowels to the sum of the per cents of frequencies of middle and back vowels. In month-old infants (2) front vowels constitute about 80 per cent of all vowels spoken, whereas middle and back vowels amount to 20 per cent of the total. In adult speech front vowels constitute 50 per cent, and middle and back vowels also 50 per cent (6). It is evident therefore that a fundamental process of development in early speech consists of the mastery of back vowels.

In order to indicate speech retardation, the vowel ratio may be applied to speech data of feeble-minded children. Table 5 presents the vowel ratios of each of the ten children for the first transcript as well as for the second one taken a year later. The values are in terms of per cents.

It will be noted that most of these ratios of front to middle and back vowels deviate greatly from that of normal adult speech. In only two cases is the ratio comparable to that of adult speech. Both transcripts for Subject 2 show the fifty-fifty relationship. The second transcript of Subject 4 also shows this proportion. The tabulation gives the per cents and the ratios for the group as a whole at the beginning and at the end of the year.

	Per Cents		Ratio	
	First	Second	First	Second
Front / Middle + Back	66 / 34	67 / 33	2 / 1	2 / 1

There can be no doubt that in the ratio of front to middle and back vowels the group as a whole has made no progress whatever, although one case did show improvement.

It would be of value to compare this result on low-grade feeble-minded with the progress during the course of a year which might possibly be made in speech status of high-grade feeble-minded children such as morons and borderline cases. Such data are not available. However, our work on infant speech sounds has advanced far enough to make tentative comparisons which may be helpful in determining approximately the developmental position of this group of feeble-minded children.

The following tabulation gives the vowel ratios for one-month infants (2), for the ten feeble-minded cases, for six-month infants (5), and for adults (6).

Subjects	Per Cent		
	Front	Middle + Back	Ratio
One-month	80	20	4 to 1
Feeble-minded (Mean age = 4 years)	67	33	2 to 1
Six-months	55	45	1 to 1 (Approximately)
Adults	49	51	1 to 1

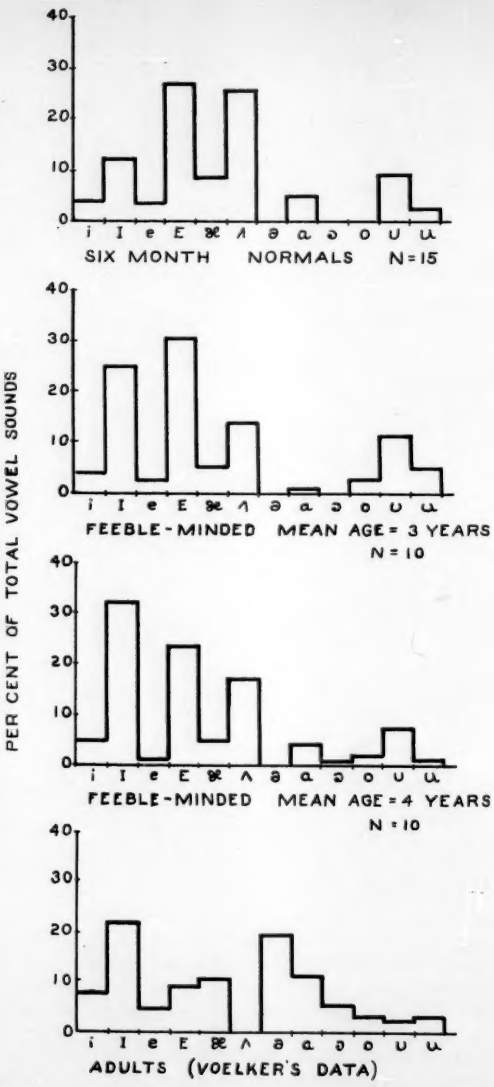
TABLE 5

Vowel Group	Subject	Transcript First	Transcript Second
Front / Middle+Back	1	69/31	96/4
Front / Middle+Back	2	49/51	50/50
Front / Middle+Back	3	83/17	77/23
Front / Middle+Back	4	15/85	48/52
Front / Middle+Back	5	66/33	57/43
Front / Middle+Back	6	77/23	97/3
Front / Middle+Back	7	92/8	70/30
Front / Middle+Back	8	91/9	69/31
Front / Middle+Back	9	57/43	42/58
Front / Middle+Back	10	62/38	84/16

Thus a series of ratios such as the above establishes the approximate position in development of these feeble-minded children.

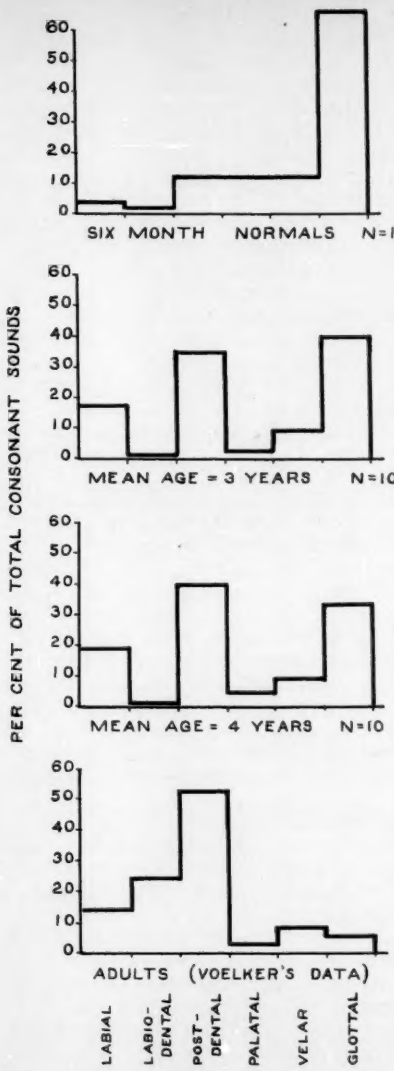
A useful graphic method for the simultaneous presentation of central tendencies in the dispersion of speech sounds is the profile (2). The method may be applied to the vowel and consonant production of the ten feeble-minded children in order to give an account of the distribution of these elements. Vowel and consonant profiles are found in Figures 1 and 2 in juxtaposition with other developmental data.

Figure 1 comprises three profiles comparing the vowel status of feeble-minded children with that of six-month infants and with adults.



VOWEL DISPERSION

FIGURE 1



CONSONANT DISPERSION

FIGURE 2

It will be apparent that there is little difference between the patterns of distribution at three years and at four years of the group of feeble-minded cases. Moreover, it is noteworthy that the concentration within each of the first three profiles is toward the left, that is, toward the front vowel sections of the profiles. Thus a profile of the dispersion of vowel sounds in the speech of the feeble-minded resembles that of six-month children much more than it does that of adult speech in which the distribution is about equal on both halves of the profile.

Figure 2 compares the two consonant profiles of the feeble-minded subjects with that of six-month infants and with that of adults. Here, too, there is little difference between the patterns of consonant distribution at the beginning and end of the year. There is a heavy concentration of elements in the glottals in the consonant articulation of infants. In adult speech concentration is largely in the labials and dentals. However, in the speech of the feeble-minded subjects consonant articulation is mainly in the labials, the post-dentals, and the glottals. Whereas among infants the consonant dispersion shows a concentration to the right of the profile, in the adult the concentration is to the left. This suggests that the problem of speech development in regard to consonants during the early stages of life is concerned to a great extent with a mastery of the articulation of labials and dentals. In this connection the status of the feeble-minded is interesting. Their profiles show an increment among the labials and dentals part way along the course of development. Glottal sounds are less frequent than in the case of the infants, but more frequent than in adults. The dominance of the post-dentals, characteristic of adults, has not been achieved. In a word, the infant and adult profiles are each unimodal with the modes at opposite ends, while the profiles for the feeble-minded definitely exhibit a trimodal type of distribution.

Although these data comprise only a segment of a broader research in the immature stages of human speech development, there are some conclusions which may reasonably be inferred from them. These are:

1. Feeble-minded children use back vowels more infrequently than front vowels. In this respect their speech resembles that of young infants rather than that of adults.

2. In consonant articulation the dispersion is trimodal whereas in young infants and adults the distributions are unimodal. The feeble-minded show a concentration in the labial, post-dental, and glottal regions while infants show the greatest piling up among the glottals, and adults among the post-dentals.

3. The ratio of vowels to consonants in the speech sounds of this group of feeble-minded children is 1, whereas that of mature speech is 1 to 2. None of the ten subjects exhibits the mature ratio.

4. The developmental status of the speech sounds of the group of four-year-old feeble-minded children approximates that of normal children less than one year of age.

5. The vowel ratio, the vowel-consonant ratio, and the profile are suitable tools for analyzing the speech sound status of retarded children.

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THE CRITICAL EVALUATION OF THE VIENNESE TESTS AS APPLIED TO 200 NEW YORK INFANTS SIX TO TWELVE MONTHS OLD[1]

DOROTHY S. ACKERMAN

This critical evaluation of the Viennese Baby Tests was undertaken in order to appraise the usefulness of the tests devised by Dr. Charlotte Buehler, for measuring the development of infants.

The main problem of this investigation was the application and validation of the Buehler tests for the second half of the first year of life as presented in "Testing Children's Development" by Charlotte Buehler and Hildegard Hetzer (1). In Buehler's developmental scale there are four series for this period of life, one each for the 7th, 8th, 9-10th and 11-12th months. Each series consists of ten items covering the fields or categories of an infant's behavior.

I. TESTS

The categories which are recognized by the tests include the fields of sense stimulation and spontaneous movements, called 1) Sense reception, and 2) Bodily movements. Another category is 3) Social behavior, or contact with other human beings. Two other fields are called 4) Learning and 5) Manipulation of materials, or the change of behavior on the basis of experience and the activity of the individual by which he controls his environment. Finally 6) Mental productivity, the creation of and striving toward goals.

All thought processes are included in this 6th category except that in this system "language", the thoughtful understanding of a situation which manifests itself in conversation, is classified under social behavior. "Imitation" is classified under "learning". The field of sense reception did not receive detailed study in our investigation because most early sensory development is made during the first half of the first year of life. The sixth field, mental production, appears in three test items for the 11-12th month period.

According to Charlotte Buehler, all instances of the use of the tests that have come to her attention yielded a median Developmental Quotient (DQ) of 1.0. The test series in the first year of life were given in Vienna to 20 children of each age group and the results of the tests established the suitability of the test items. In standardizing the Vienna test items the minimum percentages which were considered sufficient to include an item, were fixed at 66 per cent success instead of the more usual 75, because consideration was given to the fact that the performance of children in practical test situations would be below that of those tested under the experimentally optimal conditions of the standardization procedure. The Vienna percentages obtained ranged from 50 to 82 passing the item at the age-level assigned but more and less difficult items compensated each other so that the averages of all items in each series passed were 67.2 per cent.

[1] *Condensation of doctoral dissertation, Department of Psychology, Fordham University, New York, N. Y.*

In America, Ruth M. Hubbard reported a study of the reliability and validity of this Buehler Infant Scale (3). She gave 124 tests in all; thirty-eight babies were retested once and 8 babies were retested twice. Hubbard found that the reliability coefficient of the half-scale for all tests to be .96. For the alternate items for all tests of the developmental ages of the 78 children, one month through 12 months' old, the reliability was found to be .84.

To obtain a measure of the validity of the Buehler scale, Hubbard tested 11 subjects with the Merrill Palmer performance scale when they became old enough. She reported that there seem to be some tendencies for those children who rate high on the Buehler scale to rate high also on the Merrill-Palmer. Hubbard looked for another indication of the validity of the scale in the distribution of the quotients. Her distribution was fairly regular except for the trend toward the high scores.

Optimistically Hubbard concluded "that the scale seems fairly reliable in comparison with other infant scales and has some predictive capacity with respect to rating on pre-school tests. It would seem, therefore, worth while that it be given to a large group of representatively chosen American infants to determine whether or not the Buehler ratings are spuriously high for the general population."

II. SUBJECTS

The subjects of this investigation were 200 infants, 100 girls and 100 boys. Each of the four age groups (7th month, 8th month, 9th and 10th months, and 11-12th months) was composed of 25 boys and 25 girls, and each sub-group was composed of equal numbers of children of the following natio-racial extraction: British, Italian, Jewish, Nordic and Slavic.[2] Sixteen children were orphans or foundlings in two institutions.

There is evidence that a good sampling of the urban population was secured from the close approximation of the distribution of our subjects with the distributions of Florence Goodenough's socio-economic scale as shown in Table 1 by columns A and B respectively, and with the distributions of David Wechsler's educational status scale (4), as shown in Table 2.

In Table 1, Classes I and II, the professional and semi-professional and managerial, are very nearly equal in the two columns. There is no farmer group to speak of in New York City. However, Classes III, IV, V, VI of Column A, which equal 73.81 per cent of the population as a whole, are almost equal to Classes III, V, VI, of Column B, which equal 71 per cent of the present parents. Class VII includes all day laborers and here too the percentages are not very different for the two columns.

Thirty-one per cent of the parents of these children were found to be foreign born, which closely approximates the percentage (35 per cent) of foreign born in the general population of New York City (5).

[2]*Most of the subjects were secured through the Baby Health Stations of New York City through the courtesy of Dr. Margaret Barnard, the Director of these stations.*

TABLE 1

SOCIO-ECONOMIC STATUS, GOODENOUGH SCALE

Groups	Occupations of Adult Males	A Goodenough Scale Per Cent	B Fathers of Subjects
I	Professional	2.54	2.5
II	Semi-professional and Managerial	4.70	5.0
III	Clerical, Skilled Trades and Retail Business	14.42	20.0
IV	Farmers	18.74	0.0
V	Semi-skilled occupations and Minor Business	27.40	33.0
VI	Slightly Skilled Trades	13.25	17.0
VII	Day Laborers of all classes	18.96	19.0
	No information		3.5
		100.01	100.00

TABLE 2

EDUCATIONAL CATEGORIES OF PARENTS, DAVID WECHSLER SCALE

Educational Category	U.S. Population	Fathers of Subjects
College Graduate	2.93	3.0
Some College Work	4.08	2.25
High School Graduate	6.85	5.5
Some High School Work	18.99	18.25
Elem. School Graduate	18.68	34.75
Some Elementary Work	43.58	30.75
Illiterates	4.69	1.5
Unknown		4.0
	99.80	100.00

III. PROCEDURES

A few of the standard materials and toys which could not be duplicated here were imported from Vienna. This was made possible through Dr. Maria Maudry, one of Charlotte Buehler's collaborators, who was teaching at Fordham University at the time this study was undertaken.

The techniques used in testing were the same as described in the text. The tests were given at the infants' homes. Standard Buehler record forms were used for taking down all measurements. In addition a form was devised for recording of pertinent facts concerning the socio-economic status of the family, the number of children and the education of the parents.

Every subject was first given the test items, for the levels below his chronological age, until he passed all the items of a level, and items in the various categories above his chronological age level until he was no longer able to pass any items.

The developmental age (DA) analogous to Mental Age (MA) is obtained by giving day-credit for every item passed. For the series through the 8th month, each item is counted as 3 because there are 10 items for each month or 30 days. For the two series for the 10th and 11-12th months,

each item is counted as 6, since there are 10 items for 2 months or 60 days. For the series for the second year in the first two quarters, each item has a value of 9 because there are 10 items for each of the two 3-month levels. The Chronological Age (CA) is obtained by calculating the months multiplied by 30 plus the additional days of the baby's age, from his birthday to the day of the test. The developmental quotient (DQ), analogous to the Intelligence Quotient (IQ), is found by dividing the DA by the CA.

For example, if a child was 7 months and 12 days old (222 days) on the day of his test and passed 9 tests for the 7th month level, 9 tests for the 8th month and 4 tests for the 9-10th month level, he was given a basic age of 6 months plus the 27 days (9 x 3) for the 7th month; plus the 27 days (9 x 3) for the 8th month; plus the 24 days (4 x 6) for the 9-10th months - a total of 78 days, or 2 months and 18 days. This gives a DA of 8 months and 18 days (258 days). The DA of 258 days divided by CA of 222 days equals DQ of 116.

In order to facilitate examining the various categories of the series an original feature was devised: the calculation of the partial developmental ages and quotients in every field for each child by the same process used in arriving at the general DQ.

IV. VALIDATION

Distributions of the obtained developmental quotients (DQ's) for each of the four age groups and for the total groups are presented in Table 3, together with the mean, median and standard deviation of each distribution.

TABLE 3

DEVELOPMENTAL QUOTIENTS OF SUBJECTS - TABLES OF FREQUENCIES

DQ Interval	All Cases	7th Month	8th Month	9-10 Month	11-12 Month
65-69	0	0	0	0	0
70-74	2	1	0	1	0
75-79	3	1	0	0	2
80-84	3	0	1	2	0
85-89	4	1	2	1	0
90-94	15	4	3	4	4
95-99	13	3	0	4	6
100-104	46	11	12	10	13
105-109	38	9	14	8	7
110-114	29	5	5	10	9
115-119	22	7	6	5	4
120-124	10	2	4	2	2
125-129	8	2	3	2	1
130-134	5	3	0	1	1
135-139	2	1	0	0	1
140-144	0	0	0	0	0
Total Cases	200	50	50	50	50
Mean	106.67	107.66	107.67	105.9	105.44
Median	106.0	107.0	106.5	108.0	104.5
Std.Dev.	11.69	13.08	10.64	11.5	11.21

There were 163 DQ's between 90 and 120, with 12 quotients below 90 and 25 above 120, with the lowest at 73 and the highest at 138. These results are rather comparable to those obtained by Hubbard for 58 children under one year of age tested with the Buehler series.

The average developmental quotient (DQ) for our 200 children is 106.67. Buehler reported the average DQ score of her infants tested in Vienna to be 100. The slightly higher scores of our group may be accounted for by the fact that the New York children were representative of the whole urban population while Buehler's infants were all institutional children in Vienna. Our 16 institutional children averaged 101.44, which is closer to the Vienna average.

The distribution of DQ's for the total group is presented graphically in Chart 1. A normal curve has been superimposed on the histogram and it will be noted that the experimental distribution of DQ's for the total group approximates the normal distribution rather closely. Charts 2-5 present the rather close conformity of the four age groups in each instance to the normal curve of distribution.

The developmental quotients in each of the five categories of behavior were computed for each of the four age groups of 50 children and for the whole group of 200 children as shown in Table 4.

TABLE 4

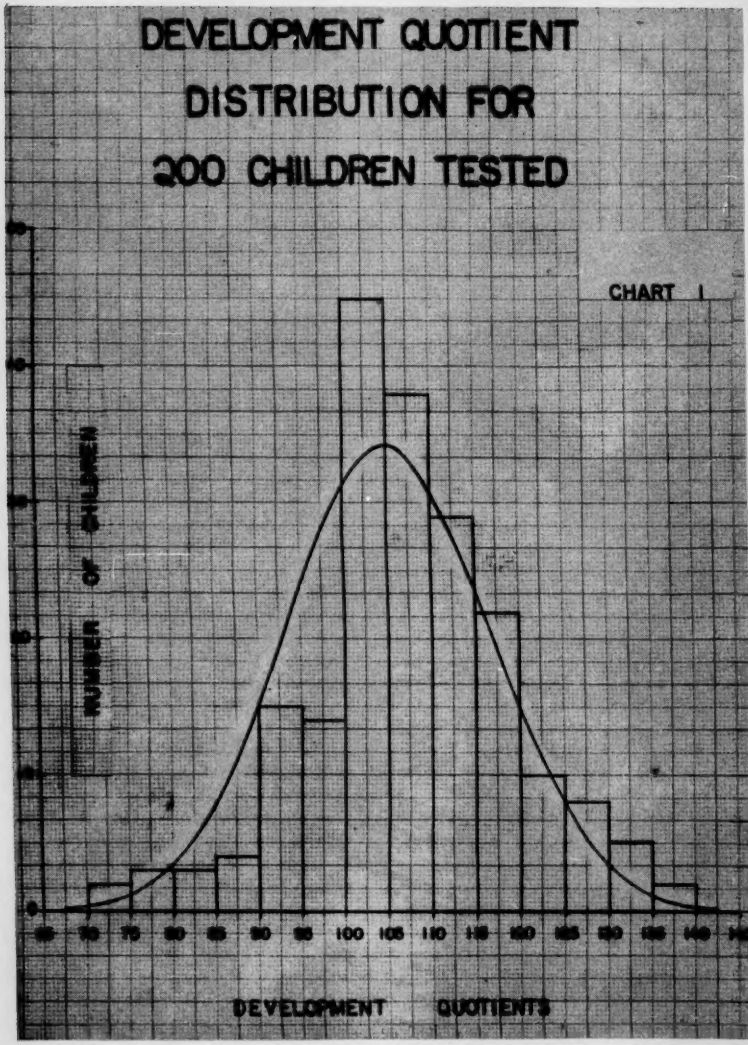
AVERAGE DEVELOPMENTAL QUOTIENTS IN FIVE CATEGORIES

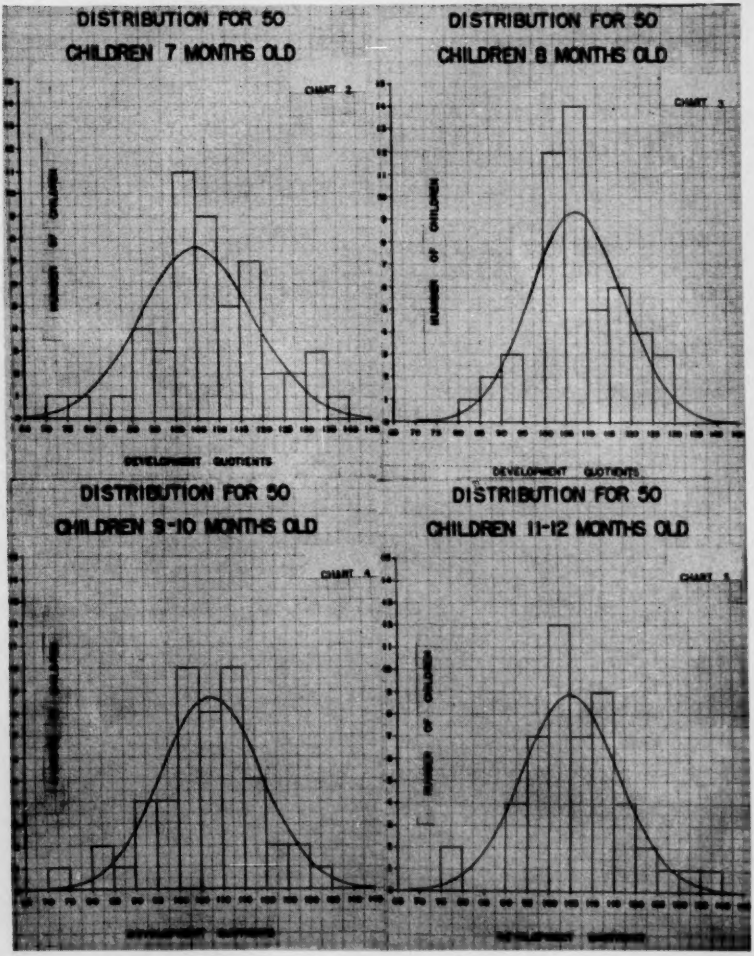
Age Groups	No.	General DQ	Bodily Control	Social Behavior	Learning	Manipulation	Mental Produc.
7th	50	107.66	107.8	107.7	105.1	107.3	
8th	50	107.67	110.5	105.3	104.0	108.2	
9th-10th	50	105.9	114.2	100.8	103.8	103.3	113.8
11th-12th	50	105.44	120.5	99.9	106.3	95.6	101.7
All	200	106.67	113.2	103.4	104.8	103.6	106.1

All the quotients are above 100. The test items in bodily movement are roughly one-third of all the items, and it can be seen that the very high average, 113.2, in bodily control raises the average score to 106.67. Moreover, the higher quotients for the older age groups show that the tests in bodily control were progressively easier for our subjects. In social behavior the quotient decreased in value from 107.7 to 99.9, which seems to indicate that these items are progressively more difficult. Learning quotients varied less from level to level than the others, and did not go as high or as low as the others. Fifty-nine children were able to pass some of the items in mental production and received developmental quotients in this field.

V. RELIABILITY

Reliability of the developmental ages was determined by splitting the odd-numbered and even-numbered developmental items, computing the Pearson product moment coefficient of correlation between the resulting


DEVELOPMENT QUOTIENT
DISTRIBUTION FOR
200 CHILDREN TESTED
CHART I
NUMBER OF CHILDREN
DEVELOPMENT QUOTIENTS


DISTRIBUTION FOR 50
CHILDREN 7 MONTHS OLD
CHART 2.
NUMBER OF CHILDREN
DEVELOPMENT QUOTIENTS
DISTRIBUTION FOR 50
CHILDREN 8 MONTHS OLD
CHART 3.
NUMBER OF CHILDREN
DEVELOPMENT QUOTIENTS
DISTRIBUTION FOR 50
CHILDREN 9-10 MONTHS OLD
CHART 4.
DISTRIBUTION FOR 50
CHILDREN 11-12 MONTHS OLD
CHART 5.
NUMBER OF CHILDREN

DA's, and correcting the coefficient so obtained by means of the Spearman-Brown prophecy formula. Table 5, columns 3 and 4, presents these reliability coefficients based upon the 200 cases and also separately for each of the age groups. For the combined age groups the reliability coefficient was .98, with the separate age groups the coefficients ranging from .92 to .96, indicating that the test has satisfactory reliability.

As an extension of the above technique, two DQ's were computed for each individual, one based upon the odd numbered items and the other upon the even numbered items. The correlations from these DQ's were averaged for each age group of 50 children separately and for all the subjects combined. These correlations were corrected by the Spearman-Brown formula and are likewise presented in Table 5, columns 5 and 6. It must be noted that the correlations between the DQ's are spurious to some degree as are all correlations between quotients. The reliability coefficient for the whole group was .94, with a range from .90 to .96 for the separate age groups.

TABLE 5

RELIABILITY OF DA'S and DQ'S FOR VARIOUS AGE GROUPS AS COMPUTED BETWEEN SPLIT-HALVES OF THE TEST ITEMS AND CORRECTED BY THE SPEARMAN-BROWN FORMULA

Age Groups Months	No. of Cases	DA's Split-half Correlations	DA Correlations Corrected	DQ's Split-half Correlations	DQ Correlations Corrected
7-12th	200	.96	.98	.88	.94
7th	50	.93	.96	.93	.96
8th	50	.86	.92	.85	.92
9-10th	50	.90	.95	.90	.95
11-12th	50	.85	.92	.82	.90

A further method used for examining the reliability of the test series was the correlation of the general DA's and DQ's, with the partial DA's and DQ's in the separate categories computing their Pearson product moment coefficient of correlation and correcting the coefficient so obtained by the Spearman-Brown prophecy formula. Table 6 presents these coefficients. In connection with the low coefficient in mental production it is to be noted that only 59 subjects passed any items of this category which appears first in the last age level of this study. In general the DA reliability coefficients are higher than the DQ coefficients.

VI. GROUP DIFFERENCES

Supplementary analyses were made on the bases of descent, sex and immediate environment of the subjects. The groups compared for influence of descent consisted of 20 boys and 20 girls, 5 at each of the four age levels. Though these numbers were too few for extensive conclusions, it is interesting to see in Table 7 that the group averages were not significantly different since the lowest DQ average was 103.63 for the

TABLE 6

RELIABILITY OF THE GENERAL DA'S AND DQ'S AND THE PARTICULAR DA'S AND DQ'S, AND CORRECTION BY THE SPEARMAN-BROWN FORMULA FOR 200 SUBJECTS

Categories	Number of items in each category	Correlation bet. DA's and DA in category	DA Correlation as corrected	Correlation bet. DQ's and DQ in category	DQ Correlation as corrected
Bodily Control	37	.80	.89	.78	.87
Social Behavior	12	.93	.96	.80	.89
Learning	15	.93	.96	.80	.89
Manipulation	9	.93	.96	.62	.76
Mental Production	3	.56	.71	.33	.50

TABLE 7

DEVELOPMENTAL QUOTIENTS FOR FIVE GROUPS ACCORDING TO DESCENT

Group	DQ	Bodily	Social	Learning	Manipulation	Mental Production
British	107.15	113.5	105.3	105.45	103.55	103.9
Italian	108.23	119.4	101.55	104.6	100.3	106.6
Jewish	103.63	107.2	100.6	101.3	105.9	105.5
Nordic	107.33	112.9	104.85	105.6	104.1	105.3
Slavic	107.05	113.2	104.1	107.1	104.25	106.1
Average	106.67	113.2	103.3	104.8	103.6	106.1

Jewish and the highest was 108.25 for the Italian group. The latter owed its high general average to its high average in bodily development (119.4); in other fields, the averages were not higher than the rest. An explanation of the lower average of the Jewish children was offered in the ratings for the four pairs of twins in this group. The DQ's of these twins averaged 93.86 and did affect the group average. This is not surprising since three of these pairs of twins were prematurely born and there is a tendency for retardation in motor and posture control of prematurely born infants.

Comparisons of the quotients of boys and girls were undertaken, and Table 8 reveals no significant differences, in agreement with the findings of Buehler and others.

It may be seen in Table 9 that the 16 children living in institutions have lower averages than the group as a whole in all fields of development except manipulation. The group of 16 however is too small in comparison with the rest of the group for extensive conclusions.

A comparison of Developmental Quotients of Groups I and II of the Goodenough Socio-Economic Scale with the Average Developmental Quotients of all the subjects resulted in the scores of Table 10.

It is interesting to note that the children of Groups 1 and 2 have

TABLE 8

ARITHMETIC MEANS AND STANDARD DEVIATIONS
OF DQ'S FOR BOYS AND GIRLS SEPARATELY

	No. of Cases	Arithmetic Means	Standard Deviations
General	100 Boys	107.5	10.5
	100 Girls	106.0	13.5
Bodily	100 Boys	115.0	17.5
	100 Girls	112.0	18.5
Social	100 Boys	104.5	14.5
	100 Girls	102.4	15.5
Learning	100 Boys	104.5	13.0
	100 Girls	105.0	14.0
Manipu-	100 Boys	103.6	11.5
lation	100 Girls	103.8	16.5

TABLE 9

DIFFERENCES BETWEEN HOME AND INSTITUTIONAL CHILDREN

Children	DQ	Bodily	Social	Learning	Manipulation
16 in Institutions	101.44	101.7	97.6	98.0	107.8
184 at Home	107.12	113.9	103.9	105.4	103.5

higher average developmental quotients in social behavior, learning and manipulation than the 200 cases as a whole, and a lower quotient in bodily control than the group as a whole.

VII. ANALYSES AND CONCLUSIONS

In order to compare the difficulty of each separate item of the four test series considered in our study, the percentages of children passing each item were arranged in Table 11 along with the average percentages of the 200 New York subjects and the 20 Viennese children. It can be seen that the American general average 66 per cent is close to the general Viennese average 67.2 per cent.

From this study the conclusion seems warranted that the following test items are unsatisfactory: 1) Field of bodily control, 11-12th month, item 2; 2) Field of social behavior, 9-10th Month, item 5 and 6; 3) Field of manipulation, 9-10th Month, item 8 and 9; 4) Field of mental production, 11-12th month, item 10.

With the above exceptions the four Buehler test series for 6- to 12-month-old children are valuable instruments for estimating the development of American infants. As a practical instrument then the test series are satisfactory but changes in certain items are advised in order to increase their general validity.

TABLE 10

SOCIO-ECONOMIC DIFFERENCES

	DQ	BODILY	SOCIAL	LEARNING	MANIPU-LATION	MENTAL
Groups I & II 15 Children	108.92	109.0	109.6	108.0	113.5	107.7
All 200 Children	106.67	113.2	103.4	104.8	103.6	106.1

TABLE 11

PER CENT OF CHILDREN PASSING THE TEN TESTS AT THEIR OWN AGE LEVELS

Series Item	7th Mo. % Test	8th Mo. % Test	9-10th Mo. % Test	11-12th Mo. % Test	All % Test
1.	96 Body	84 Body	90 Body	94 Body	
2.	78 "	88 "	82 "	86 "	
3.	88 "	66 "	90 "	90 Social	
4.	48 "	80 "	44 "	70 Learning	
5.	70 "	64 "	8 Social	90 "	
6.	68 "	80 Social	50 "	30 Manipulation	
7.	56 Social	78 "	60 Learn	22 "	
8.	64 Learn	80 Learn	38 "	40 Production	
9.	60 "	62 "	36 "	62 "	
10.	66 Manip.	66 Manip.	72 Manip.	40 "	
New York Average	69.4	74.8	57.0	62.4	66.0
Vienna Average	65.4	65	69.2	69.4	67.2

VIII. SUGGESTED REVISIONS

The following improvements are suggested 1) to replace those items considered unsatisfactory and 2) to clarify the instructions for administration, where necessary.

The Seventh Month

Item (5) - Sitting with support.

A blanket is hung over the side of the bed and Subject (S) is placed in a sitting position leaning against it (not in a corner of the crib). If the child remains in this position even for one-half minute, score plus (+).

Item (7) - Actively seeking contact.

Experimenter (E) standing beside the child's crib, pays no attention to S and avoids looking at his face. If the subject attempts to make contact by cooing, etc., or if S cooperates with E during test, accepts the presence of E and enjoys the test situation, score +.

The Eighth Month

Item (3) - Pushing away a disagreeable stimulus.

E goes through the movements of cleaning the child's nose with a piece of cotton wool. Child is in dorsal position or sitting in the lap of E. If S grasps the experimenter's hand and pushes it away from his face, score +.

Item (6) - Taking a toy away from the adult.

E places her hand in which she holds a rattle (1) within grasping distance of S in his crib. Child sits with support if necessary. If S attempts to take the toy away from E with some display of force, score +.

Item (9) - Manipulating two toys.

While S is playing with one rattle a second rattle is handed him. If S takes the second rattle without dropping the first and moves both rattles about, score +. If attention alternates from one to the other rattle, this is counted +.

Item (10) - Grasping cup by handle.

E offers S a cup as S sits with support if necessary, or on the lap of E. If S approaches the cup with both hands selecting the cup handle for grasp, score +.

The Ninth and Tenth Months

Item (3) - Sitting without support.

The child is seated in the middle of the crib without support of any kind. If S is able to hold this position for at least one-half minute, score +.

Item (4) - Crawling.

S is brought to the prone position and a favorite toy is placed before him out of reach. S moves forward by crawling. If he only rolls over sideways the item is not passed. Stomach must be off the bed, movement by knee and hands.

Item (5) - Responding to gestures or phrases or both.

E illustrates the gestures or utters the phrases or both of "bye-bye", "clap-hands", "how big", "patter cakes" or "where is the---bird, bottle or clock, etc." If S responds by specific gestures or words or both, score +.

Item (6) - Attracting the adult's attention.

E standing beside the child's crib, turns her back to him and seems occupied with other things. If S attempts to attract her attention by pulling her coat or reaching out a toy, or vocalizing, score +.

Item (8) - Imitative drumming with one stick.

E beats on the drum with one stick and hands S the stick. S imitates

the movements with the stick. This item is passed when the movement is made in the air without actually touching the drum. (The actions of the first minute are counted as the criteria.)

Item (9) - Beating two spoons together.

S sits up in bed, E stands behind him and leans over, beating two spoons together before the child's eyes. She then gives the spoons to S. S takes the spoons, manipulates them and rubs them together in some fashion. The item is passed even when the child does not succeed in actually bringing the spoons together but moves them towards each other with strained attention. The actions of the first minute are again the criteria for passing.

The Eleventh and Twelfth Months

Item (2) - Standing without support.

S is asked to stand up or is placed on his feet while support is withdrawn when it is found that he can handle the situation. If S stands without support for a moment, score +.

Item (3) - Speaking two or more words or understanding commands.

E tells S in the course of the testing procedure to "get up", "lie down", or "give that to me (or mother etc.)" without making explanatory movements. If S obeys two of these commands or S speaks two or more words spontaneously, score +.

Item (7) - Putting a spoon in a cup.

E offers S a cup and spoon separately. If S puts the spoon in the cup, score +.

Item (10) - Obtaining an object from behind a screen.

A favorite toy, such as the bell or a ball is placed before the child. As soon as he reaches for it E places the screen between the child and the toy. If S does not reach round it E can show the toy on the side of the screen and then hide it again. Usually after some unsuccessful attempts to reach through the screen, S looks or reaches behind it. This test is also counted as passed when the S pulls the screen down toward himself or away to get the object.

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SOME ASPECTS OF LEADERSHIP IN AN INSTITUTION[1]

WILLIAM FAUQUIER AND JOHN GILCHRIST

In the past the historian, philosopher, and essayist have devoted much time to the consideration of great men. Only recently, however, has the study of outstanding individuals, especially leaders, become interesting to the psychiatrist and social psychologist, although as early as 1835 Quetelet laid the foundation upon which Francis Galton, Havelock Ellis, and James Cattell based their inquiries on heredity and genius.

No serious attempt has been made in this paper to compile a complete bibliography on Leadership. The authors have made a search through the abstracts of the past decade and have examined much of the literature. W. Albig (1), for instance, lists thirty-seven authors in his chapter on leadership of whom only a few have been drawn upon for application directly to the source of this study.

The process of leadership is difficult to examine because of the complexity of personality and the difficulty of controlling the complicated variables to a degree which permits accurate interpretation and prediction. Apparently leadership is the product of many interrelated factors. "The roles and functions of the leader, the characteristics of the leader and the techniques of leadership vary with the situation. Various groups, varying in size, the nature of their constituents and the group purposes and functions, require different types of leadership" (1,p.98). Frank has pointed out that the need for leadership in any field arises from the fixed, rigid, and unchangeable patterns of thought and performance by those who, by position or seniority, control affairs (15).

"The psychologist's quest for general leadership traits," Albig believes, "has been futile" (1, p. 98). But Cowley has reported a statistical study of leadership, wherein he claims to have isolated through a factor analysis method six traits common to leadership - self-confidence, finality of judgment, motor impulsion, and speed of decision (measured in three ways). Cowley's conclusions will be dealt with later in relation to interpretations made in this study.

The intelligence factor, as have other single variables, has claimed the attention of some investigators (12, 23). Others have concerned themselves primarily with age, physical index, popularity, and scholarship (21, 25). Cowley summarizes, perhaps better than others, conclusions gained from an examination of previous literature: "Leadership obviously is not a single trait but rather a complex fashioned together as a unity. An adequate appraisal of leadership would naturally reduce this complex to its individual units, and any sort of study of leadership to be of value should produce a list of traits which go together to make a leader. If one could produce an authentic list of such leadership traits, immediate and important theoretical and practical advances might be made in our understanding and control of human behavior" (7, p. 144). A study summarized in the science section of the

[1]*This study was conducted at Berkshire Industrial Farm, Canaan, New York.*

Sunday New York Times describes the techniques used by Simoneit in the selection of German soldiers and officers (4). "The examination (of soldiers) deals with realities. It is based on intelligence analysis, expression analysis and life history. For each of these, everyday life approaches have been worked out. The method of intelligence tests has been abandoned; tasks which are en rapport with daily life are given instead. A 'leadership test' consists essentially in instructing a group of soldiers to perform some mechanical task such as making a coat hanger out of a piece of wire...' Since men can influence men only when they show themselves adequate and free, the characterological examination reaches its peak at this point,' says Simoneit"'(4). This study indicates clearly the German understanding of the pragmatical aspects of situational leadership.

Then, "It becomes quite obvious that in discussing leadership or headship two parallel studies must be made - the study of individual traits and the study of situations. Every situation stresses some traits more than others, and there can be little understanding of individual traits and their relationship to headship or leadership unless these situational stresses are known and understood" (7, p. 147).

This paper deals with leadership in an institution, the Berkshire Industrial Farm. An attempt is made to describe various aspects of the leadership process. The authors are well acquainted with each leader and have had ample opportunity to observe them in many situations. Close association with this group over a period of the last four years permits them, moreover, to consider each individual from an unusually intimate point of view.

DESCRIPTION OF THE GENERAL SITUATION IN WHICH LEADERSHIP OCCURS

The Berkshire Industrial Farm is a private, home-school for problem boys between the ages of 12 and 17. Berkshire boys may be committed by any Children's Court of New York, through agencies having legal guardianship of the individual, and directly by parents or guardians from any state in the union. All boys received are legally delinquents. Thus considered, "delinquency" includes truancy, desertion of home, disobedience, lying, stealing, and behavior difficulties resulting from emotional conflicts and improper training and supervision. Serious and advanced types of juvenile delinquents are not accepted.

The mean age for commitment is 14 years. Length of stay averages nearly 2½ years. About 64 per cent of the boys come through courts, 19 per cent from social agencies, and 18 per cent are committed privately by parents. Slightly less than 50 per cent of court cases are from New York City.

Group life in the institution is centered about the cottages, 5 in number, each accommodating 30 boys selected according to physical size, age, and social-emotional maturity. Here, under cottage parents, the boys eat, sleep, and engage in recreation suited to cottage life. Much of the group activity is scheduled in the gymnasium and on the campus. Intramural games are frequent.

Existent among the boys is more than the usual amount of loyalty to group causes which often is not conducive to the best maintenance of rules set forth by the administration as necessary for the smooth

operation of the institution. On the whole, group morale and co-operation with the staff are satisfactory, but too active co-operation by a boy with the administration is generally discouraged by the group majorities who hold to the code that fidelity is first owed to the group with whom the individual associates. On the other hand, this tie is not so strong that weak boys frequently suffer at the hands of the aggressive, especially when the reasons which have provoked tension or conflict are not considered "just" by the group.

The physical plant lies in the heart of 1100 acres in the Berkshire Hills. Buildings are scattered over a half square mile and there are no guards or walls to keep the group restricted to any section. Facilities and general plan resemble those of a good middle class boarding school. For an institution of its type, considerable freedom of movement and room for individuality are allowed its boys.

METHOD

Some 119 subjects filled out a four page, twenty-eight item questionnaire. Names of cottage leaders were obtained, as well as other data describing the leaders and each boy's leanings concerning his own fitness and aptitude for leadership. The following are typical of the questions asked:

1A Who would you say are the three most important leaders in your cottage? Name the three in order of their importance, power, and influence among the boys. They may or may not be your friends; you may even dislike them. Be honest because accuracy in this paper counts. In case you are a leader, and know it, put your name down.

6A Have you noticed how the boy you chose as the most important leader pays attention in school and to what boys and staff say to him? (Check sentence best describing him.)

Very alert, awake, and attentive most of the time.
Seems in a fog much of the time; pays poor attention.
Neither very awake nor very inattentive.

1B Do you have a special group of friends whom you "pal around with" a lot?

Yes
Sometimes
No

9B What do you think makes a leader? Is it the way he acts? The way he was born? The way he thinks? Or the way he gets things over? (Check one which shows what you think makes a leader.)

Leaders are born.
Leaders do things and "stand for" things you admire.
They are strong and kick fellows around.
They are tough and protect you.
They force their way into leadership; you can't stop them.
They know the "answers" and it pays to stick to them.

For each boy included in the study his housemother and teachers filled out a rating scale showing the position for each of eight personality traits along an agressive-normal-submissive continuum. Section A of the questionnaire administered to the boys closely duplicated the staff rating scale so that there were available estimates of the leaders by 1) the group which chose them, and 2) the staff who observed them.

RESULTS AND DISCUSSIONS

From the following accumulated data representing several variables inherent in the individual and/or in the situational aspects of group life, the matter of leadership was studied in an attempt to discover the leaders and to describe them. Because of the importance of this subject and its bearing on morale, some attention has also been given to a brief consideration of the processes of leadership in general; for concentrated in this institution are many of the factors which operate in various other societal relationships, particularly those in which exists a somewhat rigid system and attendant forces which frequently create unusual tensions.

Leadership often shows itself early in a boy's career. Garcia indicates that before age 5 there can hardly be any leadership; that from ages 5 to 8 it remains in a rather undeveloped form, becoming better defined after the 9th year. At puberty children are more decided, better developed, and better organizers (19). Normal children quickly discover the most suitable level of aggression and the role which gives them the most satisfaction - either that of submission or of dominance (2, 11). The 'delinquent' boy, it appears, has unusual difficulty in selecting the most advantageous role. At either extreme problems arise, and the quality of leadership created in any situation obviously is related to each individual's adjustment. It has been suggested by Dollard that aggression when inhibited by social pressure and the fear of punishment often shows a tendency to become displaced or to show itself indirectly. "On occasion, displaced aggression may even serve socially approved ends" (10, p. 42). Possibly leadership in the instance of a problem boy in an institution may be thought of as evidence of displaced aggression. Certainly the leaders' greater degree of ascendancy strongly suggests this possibility.

For the sake of brevity and sharper focus, the data obtained are summarized in this paper.

The data of Table 1 show the leaders to be older, of longer residency, taller, and heavier. These findings are in accordance with other investigators (21, 23, 17, 25). They rate, however, lower in intelligence, which is contrary to the conclusions of others (21, 23, 17). Interestingly, the leaders have a significantly lower misconduct count and appear better adjusted than their followers.[2] This is corroborated by the data of Table 4.

Selection of the leaders by the boy group was conducted as follows: three points were credited to an individual listed as first choice, two

[2]*Misconduct for six months previous to time of study.*

TABLE 1

MEAN LENGTH OF RESIDENCE, AGE, VERBAL AND NON-VERBAL INTELLIGENCE QUOTIENTS, NUMBER OF MISCONDUCT REPORTS FOR "AVOIDANCE OF RESPONSIBILITY," NUMBER OF MISCONDUCT REPORTS FOR "ANTI-SOCIAL AND INFANTILE BEHAVIOR:"[3] MEAN HEIGHT AND WEIGHT FOR LEADERS AND FOLLOWERS

	Mean	
	Leaders	Followers
Number in group	29	90
Chronological age in months	185.41	173.05
Length of residence in months	19.65	15.07
Binet I.Q.	96.20	100.65
Chicago Non-Verbal I.Q.	96.20	95.60
Number of reports for "Avoidance of responsibility"	8.00	15.16
Number of reports for "Anti-social and Infantile Behavior"	6.10	9.31
Height in inches	66.32	60.86
Weight in pounds	124.50	104.35

points as second choice, and one point as third choice. Twenty-nine boys, credited with 638 points or 97 per cent of the total points were arbitrarily accepted as leaders. Table 2 shows the ratings of the staff compared to ratings of the followers.

The data of Table 2 raise the question as to the validity of the staff ratings upon which many of the conclusions in this study are drawn. A general tendency by staff members to overrate considerably the ascendant traits of leaders compared to ratings by the followers is noticeable, the boys - perhaps because of bias - tending to think of their comrade leaders as being more strictly normal in most cases. These discrepancies may be accounted for in two ways. First, the standards of aggression and submission appear to be primarily different for the two groups of raters. Second, the boys are not trained in making accurate quantitative discriminations of personality traits, especially through a medium of measurement which in some instances they may not well comprehend.

To check the statistical reliability of the rating scale used by the staff a quantitative scoring was devised as follows: three points for each trait given an aggressive rating, two points for a normal rating, and one point for a submissive rating. This provided a possible point score from 10 to 30 in terms of degree of ascendancy shown.

The most interesting discrepancy between the two groups of raters was in their selection of leaders. Assuming that the boys are 100 per cent accurate, at least in recognizing the leaders within their special groups, it was found that the teachers selected only 39 per cent and the house-parents only 27 per cent of the 29 leaders indicated by the boys. This difference strongly suggests that leaders are not easily recognizable by even competent observers. G. W. Allport suggests that leaders

[3] *A daily record of misconduct is kept for each boy and tabulated according to type every month. This affords a valuable objective criteria for the quantitative measurement of behavior. The procedure has been described in detail in three earlier studies (11, 12, 13).*

TABLE 2

ASCENDANT AND SUBMISSIVE TRAITS OF BOYS CHOSEN AS LEADERS RATED BY STAFF AND BY THEIR FOLLOWERS

Trait Rated	Percentage Rated as Being	
	By Staff	By Boys
Ascendant Traits:	(41.0)	(20.4)
Actively resistant	15	9
Generally aggressive	52	11
Bold in relations with adults	30	13
Very alert and attentive	56	26
Actively cooperative	59	28
Attention getter	41	27
Excitable, temper, etc.	45	23
Impulsive in behavior	30	26
Submissive Traits	(11.1)	(20.0)
Passively resistant	7	23
Generally submissive	19	19
Timid in relations with adults	11	11
Inattentive, dissociated	11	11
Passively cooperative	15	40
Withdrawn, day-dreamer	4	10
Phlegmatic, even tempered	15	13
Planful and cautious in behavior	7	33

TABLE 3

MEAN, PROBABLE ERROR OF MEAN, AND PROBABLE ERROR BETWEEN THE MEANS OF THE POINT SCORES ON THE RATING SCALE FOR THE LEADER AND FOLLOWER GROUPS

Group Rated by Staff	Mean Aggressive Score	Probable Error of Mean	Probable Error Between 2 Means
Leaders	21.78	0.326	6.37[4]
Followers	19.23	0.227	

do not necessarily have to be ascendant and that less outgoing leaders may frequently have more aggressive boys who act as their intermediaries (2, p. 144). Certainly there are many situations in which face-to-face or direct control does not operate, although the general indication is that leaders are more dominant and aggressive.

Albig suggests that, "The leader appears as master of the situation. He is dominant and assured" (1, p. 100). Certainly the leaders chosen by the boys and rated by the staff show considerably more dominance. They are more alert, aggressive, cooperative with powers they recognize, show considerably more impulsiveness, excitability, and desire to hold the center of attention. This corroborates Cowley's conclusions that

[4]*This probable error between the two means satisfies the rule that a difference or a statistical constant of any sort must be at least four times its probable error to be considered significant.*

TABLE 4

STAFF RATINGS OF LEADERS COMPARED WITH FOLLOWERS

Trait Rated By Staff	Percentage Rated as Being	
	Leaders	Followers
Ascendant Traits	(41.0)	(28.0)
Actively resistant	15	21
Generally aggressive	52	42
Bold with adults	30	29
Very alert and attentive	56	28
Actively cooperative	59	24
Attention-getter	41	31
Excitable, temper, etc.	45	33
Impulsive in behavior	30	16
Submissive Traits	(11.1)	(27.2)
Passively resistant	7	20
Generally submissive	19	26
Timid with adults	11	26
Inattentive, dissociated	11	30
Passively cooperative	15	31
Withdrawn, day-dreamer	4	25
Phlegmatic, even tempered	15	21
Cautious, planful in behavior	7	39

self-confidence, finality of judgment, motor impulsion, and speed of decision are factors essential to leadership. The situational factors should not, however, be lost sight of. Perhaps leadership in an institution for delinquent boys calls for greater physical ability, alertness, aggression, excitability, and other ascendant expressions than would be necessary in groups elsewhere - boys' clubs in churches, Boy Scouts, etc. Lewin, Lippitt, and White (18) indicate that the type of restricted environment, peculiar to institutions, characteristically produces more aggressive behavior than would be expected of individuals in a more democratic and less regulated environment.

It is certain that considerably greater intensity of frustration is daily present among problem boys in strictly controlled situations than among "normal boys" living in society. If so, it probably follows that displaced aggression finds its outlet in leadership (10, p. 42) which stresses the traits previously emphasized (10).

TABLE 5

SOME SELF RATINGS OF LEADERS AND FOLLOWERS

Question Asked	Percent Affirmative Reply	
	Leaders	Followers
Do you have a special group of friends?	38	51
How frequently are you chosen captain?[5]	73	40
Do you like living in an institution?	86	68
Are you a leader?	55	17

[5] *In a previous study (12) it was reported that a higher number of aggressive boys preferred competitive group games than did submissive boys.*

The data of Item 1, Table 4 seem to prove greater extroversion, security, and feelings of self-adequacy by the leaders. Bogardus has suggested that the holdings of associates at a distance by persons of ability may be a leadership trait (5). Ries (26) believes that physiological components (which work in the production of frustration) are important in leadership. Leaders have fewer affective attachments, admit themselves to be more frequently chosen as leaders, recognize their own qualities of leadership better, and seem less frustrated by competitive group living. Perhaps they are able to reconcile their lot in the group more effectively through leadership.

Nafe (20) quotes Goethe as describing the leader as a konnig man (a man who can) and stresses both the situational aspects of leadership and the "emotional set" which motivates some people to leadership. This further suggests that leadership, like play habits, has "the most intimate affective connections with the highly elaborated tissue-needs of the individual" (12, p. 124).

Further descriptive data were furnished by the last section of the questionnaire. Some 45 per cent of followers rate leaders as being "tough, handy with their fists, and honest;" 44 per cent think of them as "honest, regular fellows." This seems to preclude the possibility that leaders in this institution attain their control through fear and physical dominance. Albig warns that "Leadership (1, p. 96) must be distinguished from domination (See Reference 24), the leader from the headman (7); leadership must be distinguished from coercion (27), power from power over" (14).

In 59 per cent of instances the followers describe leaders as "clean cut fellows who do their best to get along;" 22 per cent as a fellow "who shows interest and helps you;" 20 per cent as a fellow "who knows the answers and it pays to stick to." The need for security, common in various degrees to all people, is perhaps more accentuated in the problem boy by the uprootings which invariably have occurred before he reaches an institution. In many instances, the institution is the last attempt at rehabilitation. Here the delinquent boy immediately and continuously seeks for emotional rapport or tie-up. Older and more dominant individuals often furnish this necessity. To illustrate this point, 57 per cent of the followers describe the leader as "a fellow who does things and stands for things you admire." These 'things', of course, undoubtedly contribute to the followers' sense of security and adequacy.

In a number of instances the leader quite clearly symbolizes the frustration of the followers. Some 39 per cent of the followers admit admiring leaders because it gives them "a feeling of importance;" 30 per cent believe leaders "are smarter" than they; about 17 per cent resent the leader and voice their hostility against him. It is also noteworthy that 17 per cent of the followers believed they were leaders although their group did not list them as such.

SUMMARY

The statistics and conclusions of this study meet the test of practical observation. After four years of uninterrupted observation of

boys in this institution, the authors note that many factors emphasized by the study appear to be operating in the daily lives of the subjects. Individual and group tension highlight the bully and the egocentric as producers of trouble and unrest rather than the boys accepted as leaders.

That dominance, aggression, boldness, impulsiveness, excitability, and alertness find their most frequent expressions in the personality of the leader are facts inherent in the results of this study and in the observation of the activity of the boys. This study suggests paradoxically that it is with the socially acceptable leader whom frequently adults do not recognize that morale and group control rests and through whom it may most positively be manipulated.

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A STUDY OF HEIGHT IN WHITE SCHOOL CHILDREN FROM 1937 TO 1940 AND A COMPARISON OF DIFFERENT HEIGHT-WEIGHT INDICES

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In two previous papers (1, 2) the trend of body weight has been discussed for white school children of Hagerstown, Maryland, for the successive calendar years 1933 through 1940, and in the two four-year periods, 1933 to 1936 and 1937 to 1940. The results were compared with the findings of Palmer (3, 4, 5) for a preceding period (1921 to 1927) in the same community. The main results in brief were as follows: There is to be observed a distinct secular upward trend in weight for all age groups and for both sexes. For boys the mean increase of body weight during the eight years 1933-1940 is apparent in every age (though not to the same degree), and is statistically significant for each group from 6 to 15 years. For girls the weight increase is beyond the limits of mere chance fluctuation in the lowest age group, 6-7 years, and for those above 9 years.

Whatever the reasons may be, the tendency towards an increase of growth is world-wide and, for example, has been reported recently from Zürich, Switzerland (6) for a period covering almost the same years, 1934 through 1939, as the new growth studies in Hagerstown. This secular tendency has been observed throughout the United States in different geographical regions, racial stocks, and socio-economic groups and recently reviewed by Meredith (7, 8).

It will be of special interest now to discuss the behavior of stature for the white school children in Hagerstown. Measurements regarding height have become available for four successive calendar years, 1937-1940. The observational data covering this period comprise a total of 19,949 height measurements, 10,065 on boys and 9,884 on girls. The measurements have been taken each year, together with the weighings, within the first half of May. The age has been taken as of the last birthday before the date of examination, assumed to be May 1, as described in greater detail in the former papers.

The measurements after the children discarded shoes have been recorded in centimeters. The number of children measured in each of the successive years, 1937 to 1940, is given in Table 1, which also shows the age range of the children. Since the age distribution of boys and girls is practically the same as given in the last paper (2) for the children weighed in Hagerstown, the single numbers need not be repeated.

By far the largest part of the measurements was taken on children 6 through 16 years of age, namely 9,794 on boys and 9,608 on girls. For the older pupils, 17 years of age and up, there were available only 271 and 276 measurements on boys and girls, respectively: all taken in the last calendar year, 1940. Thus the values obtained for the older Hagerstown school children are not yet as representative as are those for the younger ages.

TABLE 1

NUMBER OF BOYS AND GIRLS MEASURED IN HAGERSTOWN, MD. 1937 to 1940

Year	Boys	Girls	Total	Age Range
1937	2,106	2,045	4,151	6 - 16 years
1938	2,367	2,378	4,745	6 - 16 years
1939	2,548	2,422	4,970	6 - 16 years
1940	3,044	3,039	6,083	6 - 20 years
All Years	10,065	9,884	19,949	

THE TREND OF STATURE IN WHITE HAGERSTOWN SCHOOL CHILDREN FROM 1937 THROUGH 1940

In Table 2 the means of body height and their standard errors are given by age and sex for the four successive calendar years. The weighted average of the whole four-year period is added also and may be considered to represent a standard of stature for the group under observation. Of course, for the reasons mentioned before this can be assumed only of the school children 6 to 16 years of age.

It is quite evident that in no age group of the two sexes is there any systematic secular trend in height. All the variations in the single calendar years lie within the limits of chance fluctuation, mostly within a single standard error. This can be easily verified in each instance if the mean heights from year to year are compared with the average height for 1937-1940. Thus the results with regard to height are very different from what has been found for weight (2). Average height of children of the same age did not vary significantly in the four years under observation, whereas for weight there was a distinct upward trend observable even in this short time period. Of course, in such a short period not much change in average height can be expected since stature is less affected by minor environmental factors than is body weight.

Sex Difference in Height and Weight. Another point worth mentioning is the well-known sex difference in body height at different ages. This is shown by plotting the height averages for the total period 1937-1940 (Graph 1).

In the ages from 6 to 10 years the sex differences are small, the boys being somewhat taller than the girls. The curve for girls crosses the one for boys before 11 years of age is reached and at the ages 11 to 13 years, the girls significantly exceed the boys (by 1.4 to 2.5 cms. in the three age groups). Immediately before the 14th year of life is completed the curve for females cuts again that for males and remains below for all the subsequent ages. At the age 14-15 years, or the midpoint of this interval, 14½ years of age, the sex difference amounts to exactly 2 cms.; at 15-16 years, it amounts already to 5.8 cms., and at 16-17 years of age to almost 10 cms. The findings are in good agreement with those of former investigators (for instance B.T. Baldwin (9), Collins and Clark (10), Steggerda and Dennsen (11). It may be further of

TABLE 2

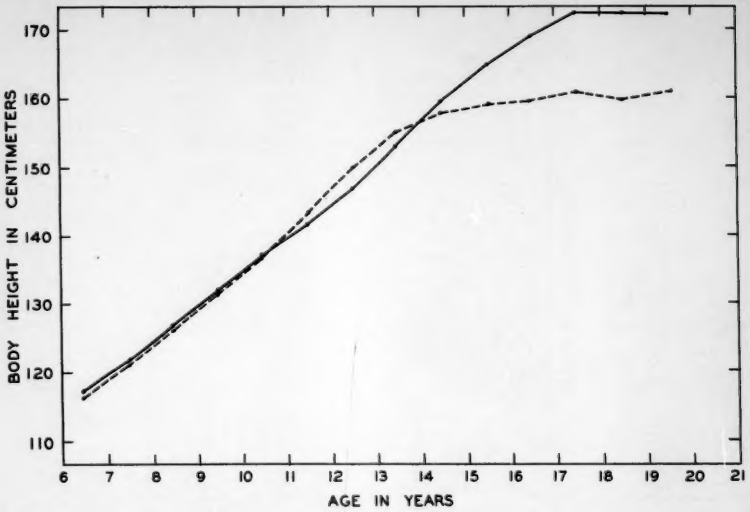
MEAN STATURE IN CMS. OF BOYS AND GIRLS MEASURED IN HAGERSTOWN, MD. 1937 to 1940

Age in years	Boys				
	1937	1938	1939	1940	1937-1940
6-	117.1 ± .46	117.9 ± .43	117.0 ± .37	116.7 ± .46	117.2 ± .21
7-	121.4 ± .42	121.8 ± .36	121.5 ± .38	121.6 ± .35	121.6 ± .19
8-	127.2 ± .40	127.1 ± .40	126.2 ± .37	127.2 ± .39	126.9 ± .19
9-	132.3 ± .38	132.0 ± .41	131.9 ± .41	132.6 ± .41	132.2 ± .20
10-	136.9 ± .39	137.1 ± .35	136.7 ± .43	137.5 ± .43	137.1 ± .20
11-	141.7 ± .44	141.6 ± .40	141.6 ± .38	142.1 ± .42	141.8 ± .20
12-	146.8 ± .46	146.8 ± .47	146.7 ± .42	147.7 ± .45	147.0 ± .23
13-	153.6 ± .48	153.7 ± .50	151.8 ± .50	153.3 ± .49	153.1 ± .25
14-	158.5 ± .70	160.6 ± .53	160.0 ± .50	159.0 ± .52	159.6 ± .27
15-	163.6 ± 1.02	164.3 ± .74	165.3 ± .59	164.9 ± .52	164.8 ± .33
16-	166.2 ± 2.45	167.6 ± 1.05	167.3 ± 1.16	170.1 ± .51	169.1 ± .43
17-				172.7 ± .62	
18-				172.3 ± .67	
19-				172.6 ± 1.17	
20-				174.9 ± 1.44	

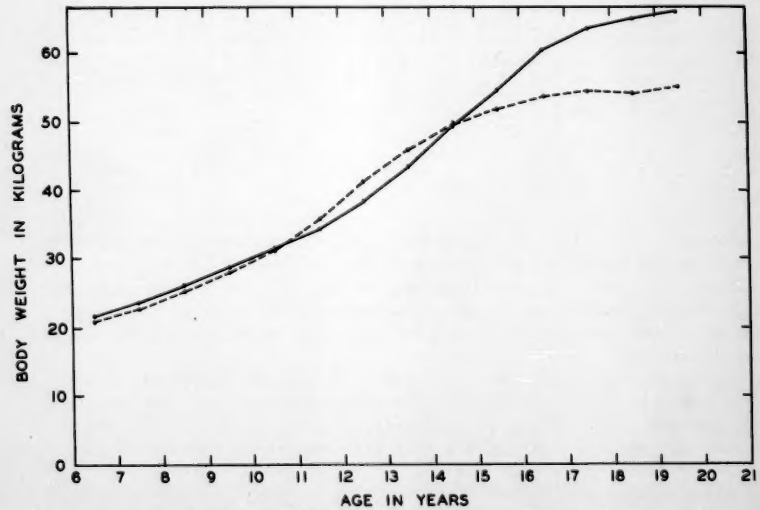
	Girls				
	1937	1938	1939	1940	1937-1940
6-	116.5 ± .49	116.8 ± .41	115.8 ± .36	116.6 ± .42	116.4 ± .21
7-	121.5 ± .38	121.4 ± .35	120.7 ± .36	120.6 ± .32	121.0 ± .18
8-	126.0 ± .33	126.4 ± .38	126.3 ± .39	126.6 ± .40	126.4 ± .19
9-	132.6 ± .43	131.3 ± .36	131.3 ± .39	131.6 ± .41	131.7 ± .20
10-	136.9 ± .45	137.7 ± .43	136.0 ± .38	136.9 ± .44	136.9 ± .21
11-	143.8 ± .49	142.8 ± .47	143.0 ± .48	143.2 ± .46	143.2 ± .24
12-	149.4 ± .42	150.1 ± .48	149.0 ± .50	149.6 ± .49	149.5 ± .24
13-	154.6 ± .42	154.8 ± .38	154.5 ± .40	154.8 ± .45	154.7 ± .20
14-	156.5 ± .47	158.1 ± .34	157.5 ± .34	157.8 ± .37	157.6 ± .19
15-	158.1 ± .75	159.0 ± .44	158.1 ± .45	159.8 ± .34	159.0 ± .22
16-	155.8 ± 1.88	160.2 ± .93	159.1 ± .75	159.5 ± .37	159.4 ± .31
17-				160.7 ± .43	
18-				160.1 ± .63	
19-				160.8 ± 2.01	

interest to note that, as Steggerda found, the decussation points of the male and female curves are approximately the same for different races although in his study, for instance, the Maya Indians are about 10 cms. shorter for each age of childhood than the Navajo Indians, and still shorter when compared with the Dutch White and Negro children of the same ages (12).

It may be recalled from the former growth study (1, 2) on weight of the same generation of school children in Hagerstown that the behavior of the sexes regarding body weight was similar. Although the growth rates for height and weight are very different (weight is increasing with age much faster than height), the sex differences resemble each other closely for both measurements. This is shown in Graph 2 in which the average weights for the same period of observation are plotted. The values in pounds, as reported in the former study (2), are converted here into kilograms. The number of weighings approaching 20,000 for the



Graph 1. Mean stature in cms. of white boys —— and girls ---- measured in Hagerstown, Maryland, based on 19,402 measurements, 6 to 16 years of age, average of 1937/1940,547 measurements, 17 years of age and up, 1940 only.



Graph 2. Mean weight in kilograms of white boys —— and girls ---- in Hagerstown, Maryland, based on 19,450 weighings, 6 to 16 years of age, average of 1937/1940, 547 weighings, 17 years of age and up, 1940 only.

four calendar years, 1937-1940, was almost the same as that of height measurements described above.

As shown in Graph 2, from 6 to 10 years of age the girls are somewhat below the boys in body weight, yet the differences are small. Shortly before the age of 11 years is reached the female line crosses the male curve and stays above for the following three age years, up to 13-14 years of age, when the girls exceed the boys in weight by 2.4 kilograms on the average (more than 5 pounds). It was very much the same with regard to height in these three years. At the age group 14-15 years, the mean body weight is practically the same for the two sexes, 49.3 ± .30 kilograms for boys and 49.4 ± .28 kilograms for girls. Soon after the midpoint of this age group, 14½ years, the curve of the girls crosses again the curve of the male sex and remains then permanently below. The only minor difference between the growth patterns in height and weight is that the curve of the female sex approaches that of the males somewhat earlier for stature than for weight, the crossing-over being for height at nearly 14 years, for weight soon after 14½ years of age.

This deviation from the general uniform behavior of the sex difference may be reasonably explained by the fact that the girls at age 14 (or more exact when they have completed this year of age) in the majority have already filled out the figure and, therefore, outweigh the boys of the same stature. For ages above this, the boys considerably surpass the girls in mean body weight as in height. For the growing ages as a whole, and therefore the physiology of growth, the conclusion seems to be safe that it is not so much the sex that determines the weight but rather the height of a growing person be it a boy or girl. Only in a short period of prepuberty sex, independent from the stature reached, plays its part.

The striking parallelism in the behavior of the sex difference regarding height and weight is further to be realized, when a Female/Male Index for both characteristics is computed as shown in Table 3.

The sex ratio, of course, will vary in the different age groups within the following limits: Female/Male Index $\leqq 1$. Therefore, by taking the male sex as the unit, the index value approaches 1 when the sexes are alike; the index is less than 1 if the female is shorter or lighter than the male; it is more than 1 if the female becomes taller or heavier than the male for the respective measurements. Thus the sexual dimorphism can be easily demonstrated in respect to each quality of bodily dimensions (13, 14). The following table makes it evident that in each age group there is perfect concordance of the index values for height and weight in so far as these values are either below or above 1, except in the age group 14-15 years. For this age group the girls are already distinctly smaller than the boys (the Female/Male Index being .987) but still somewhat heavier (the F/M Index being slightly above 1). If we interpolate the tabulated values for the exact point of 14 years of age on the assumption of an even distribution within the neighboring groups (13-14 and 14-15 years of age), a Female/Male Index of .999 is obtained for height and of 1.029 for weight. Thus the girls at the completed 14th year of age are still as tall as the boys of the same age, but according to the weight index they are distinctly heavier.

Variability of Height as Compared to Weight. To obtain a view of the height variability during the growing ages Table 4 shows the standard deviations of the mean stature for the single calendar years from 1937 through 1940 and the weighted standard deviation for the period as a whole.

TABLE 3

FEMALE/MALE INDEX FOR HEIGHT AND WEIGHT FROM 6 TO 19 YEARS OF AGE OF WHITE SCHOOL CHILDREN IN HAGERSTOWN, MD., 1937 TO 1940*

Age in Years	Height	Weight
6-	.993	.968
7-	.995	.958
8-	.996	.965
9-	.996	.969
10-	.999	.994
11-	1.010	1.029
12-	1.017	1.065
13-	1.010	1.055
14-	.987	1.002
15-	.965	.952
16-	.943	.886
17-	.931	.857
18-	.929	.832
19	.932	.834

* 17-19 years of age, only 1940

TABLE 4

STANDARD DEVIATION OF STATURE (CMS.) OF WHITE SCHOOL CHILDREN IN HAGERSTOWN, MD., 1937 TO 1940

Age in years	Boys					Girls				
	1937	1938	1939	1940	1937-1940	1937	1938	1939	1940	1937-1940
6-	5.3	4.9	4.9	5.3	5.1	5.2	5.1	4.7	5.2	5.0
7-	5.6	5.5	5.9	5.4	5.6	5.4	5.1	5.4	5.4	5.3
8-	5.9	5.9	6.0	6.1	6.0	5.1	5.7	5.8	6.3	5.7
9-	6.0	6.2	6.5	6.7	6.3	6.7	5.7	6.0	6.5	6.2
10-	6.2	5.8	6.7	6.8	6.4	7.0	6.9	6.1	6.9	6.7
11-	7.0	6.6	6.3	6.8	6.7	7.7	7.4	7.8	7.0	7.5
12-	7.9	7.6	7.2	7.6	7.6	7.0	8.0	7.9	8.1	7.7
13-	7.8	8.5	8.3	8.6	8.3	6.5	6.5	6.8	7.3	6.8
14-	9.1	8.5	8.9	8.6	8.7	6.2	5.5	5.8	6.2	5.9
15-	8.5	9.1	7.7	9.0	8.6	5.4	5.5	5.8	5.9	5.7
16-	11.2	7.4	8.2	7.5	7.8	6.0	5.5	5.5	5.5	5.5
17-				7.7					5.7	
18-				5.9					5.9	
19-				6.1					8.5	
20-				5.4						

The variability of height during the single years of observation presents no consistent trend for children of the same ages. However, it will be seen that there is an upward trend with age from 6 to 15 years for boys and from 6 to 12 years for girls. (See also Baldwin (9), Palmer and Reed (15)). Considering only the averaged values of the four-year period 1937-1940, the standard deviation increases in boys from 5.1 cms. in the age group 6-7 years to 8.7 cms. in the age 14-15 years. After the age 15-16 variability of height decreases again. In girls the standard deviation of height rises from 5.0 cms. in the youngest age group, 6-7 years, to 7.7 cms. in the age group 12-13 years, then decreases slowly from this prepuberty stage on.

To demonstrate the differing variability of height and weight with increasing age, in Table 5 the averaged values of the standard deviation and the relative parameter of variability are contrasted.

TABLE 5

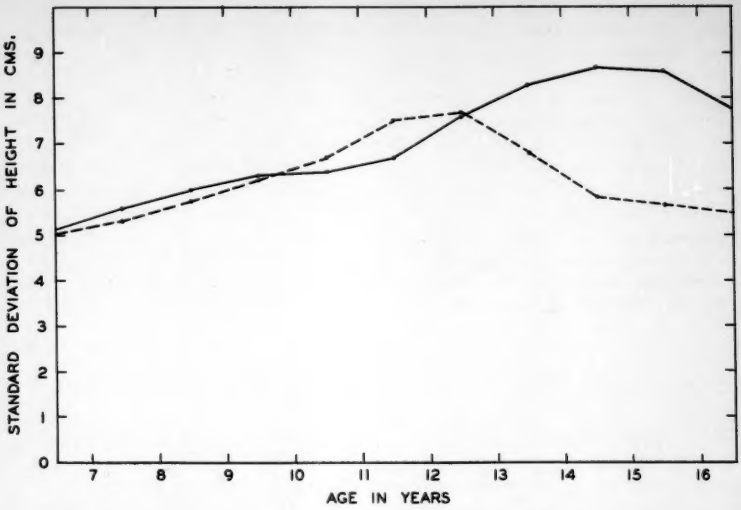
STANDARD DEVIATION AND COEFFICIENT OF VARIATION OF HEIGHT AND WEIGHT, WHITE SCHOOL CHILDREN OF HAGERSTOWN, MD. IN THE AVERAGE OF 1937 TO 1940

Age in years	Height		Weight		Height		Weight	
	Standard deviation (cms.)	Coefficient of variation (per cent)	Standard deviation (kgs.)	Coefficient of variation (per cent)	Standard deviation (cms.)	Coefficient of variation (per cent)	Standard deviation (kgs.)	Coefficient of variation (per cent)
	Boys				Girls			
6-	5.1	4.3	2.8	13.0	5.0	4.3	2.5	12.0
7-	5.6	4.6	3.4	14.4	5.3	4.4	3.1	13.7
8-	6.0	4.7	4.0	15.4	5.7	4.5	3.8	15.1
9-	6.3	4.8	4.4	15.3	6.2	4.7	4.7	16.9
10-	6.4	4.7	4.8	15.3	6.7	4.9	6.4	20.5
11-	6.7	4.7	5.8	16.8	7.5	5.2	7.8	22.0
12-	7.6	5.2	7.3	19.0	7.7	5.2	9.4	23.0
13-	8.3	5.4	8.7	20.0	6.8	4.4	9.3	20.3
14-	8.7	5.5	9.7	19.7	5.9	3.7	9.0	18.2
15-	8.6	5.2	10.2	18.8	5.7	3.6	8.6	16.6
16-	7.8	4.6	11.2	18.6	5.5	3.5	9.2	17.2
17-*	7.7	4.4	8.8	13.9	5.7	3.5	8.1	14.9
18-*	5.9	3.5	9.1	14.0	5.9	3.7	9.5	17.6
19-*	6.1	3.5	8.8	13.3	8.5	5.3	11.8	21.4
20-*	5.4	3.1	14.8	21.1				

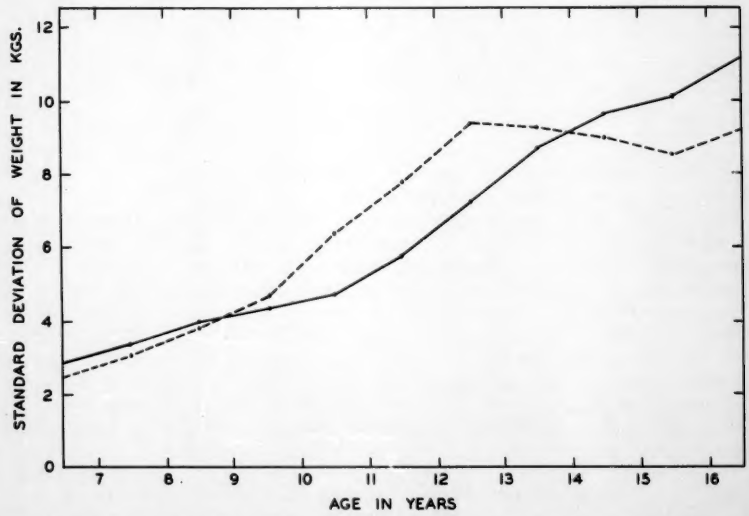
*1940 only

It is evident that the variability of body weight is in every age group and in both sexes considerably larger than the variability of body height. This consistent difference over all ages is more clearly demonstrated by the relative values of variation than by the absolute values of the standard deviation. Whereas the standard deviations of weight (in kilograms) are partly smaller and partly larger than the standard deviations of height (in centimeters), the relative values of variation are consistently in all ages higher for weight. The different variability is illustrated in Graphs 3 and 4 which show the standard deviations of stature and body weight from 6 through 16 years of age; omitted from the graph are the latter ages for which the numbers are very small and the biometric constants, therefore, not yet sufficiently representative.

The analysis of the last data brings out the sex difference in the variability of height and weight. In spite of a widely differing range of the plotted values, the biometric constants of variation in both height and weight of the two sexes show a very similar trend. This is much like the mean heights and weights themselves in the course of the



Graph 3. Variability of stature in white school children, Hagerstown, Maryland, standard deviation (average of 1937-1940) for boys —— and girls ----, 6 to 16 years of age.



Graph 4. Variability of body weight in white school children, Hagerstown, Maryland, standard deviation (average of 1937-1940) for boys —— and girls ----, 6 to 16 years of age.

growing years and is a relatively new observation. It will be seen from the tabulated values (Table 5) and from the graphs that in the ages from 6 through 9 years the parameters of variability in height are somewhat greater for boys than for girls; it is the same with regard to weight for the school years, 6 to 8. Then follows a period in which the variability in height and weight is greater for girls than for boys; it is so for height in the years from 10 until the midpoint of the 13th year, for weight from 9 years of age up to almost the end of the 14th year. Thus the greater weight variability of the girls starts one year earlier and closes one year later as compared with height variability.

After the decussation points, between 12 and 13 years of age for height, and between 13 and 14 years of age for weight, all four variability constants begin distinctly to decrease. Some later irregularities of the variability trends during sexual maturity may be due to chance fluctuation on account of the small numbers involved. However, the greater weight variability of the girls, from 17 years on, than of the boys may indicate a wider variation of mean weight in the female sex after sexual maturity has been reached and growth in stature has been finished.

The Height-Weight Ratios as an Index of Body Build. To close the separate considerations for mean body weight and stature and the age trend of variability presented in the present and preceding papers for the white school children of Hagerstown, it might be worth while to relate body weight to stature by some sort of an index of body build during the growing years. This is possible for the period, 1937-1940, in each year of which both measurements for the same generations of school children are available.

The results as obtained on basis of the means by three different indices (Quetelet index or "centimeter-weight" $= \frac{\text{Body weight}}{\text{Stature}}$; Davenport-Kaup index $= \frac{\text{Body weight}}{\text{Stature}^2}$; Livi-Rohrer index ponderalis $= \sqrt[3]{\frac{\text{Body weight}}{\text{Stature}}}$ x 100 or $\frac{\text{Body weight}}{\text{Stature}^3}$ x 100) are given in Table 6, after the conversion of pounds to the metric system. Of these body weight-stature ratios, the old Quetelet index has the clearest and simplest meaning stating only how many units of mass (grams) in a given individual or an average group correspond to a unit of stature (centimeter). We will not go into more details about the much discussed concept of a suitable height-weight index for determining children's physical development; (for more literature on body build indices see Pearl (16)).

The results on height and weight previously discussed make it obvious that the white school children of Hagerstown during the years 1937-1940 have necessarily increased their body weight index from year to year, whichever ratio may be chosen for the secular comparison. It holds true for almost every age class and equally for both sexes. Since there was a significant increase of mean body weight while mean stature has been constant within the limits of chance fluctuation, the mean weight per unit of stature or any function of stature must necessarily increase. Therefore, the indices must show the same secular trend as the mean weights alone. Whether this fact means an improvement of

TABLE 6

COMPARISON OF WEIGHT-HEIGHT INDICES OF QUETELET, DAVENPORT-KAUP, AND ROHRER AS OBTAINED FROM MEAN VALUES IN HAGERSTOWN, MD., 1937 TO 1940

Age in years	Quetelet* $\frac{W}{H}$	Kaup ** $\frac{W}{H^2}$	Rohrer *** $\frac{W}{H^3} \times 100$	Quetelet* $\frac{W}{H}$	Kaup ** $\frac{W}{H^2}$	Rohrer *** $\frac{W}{H^3} \times 100$
	Boys			Girls		
6-	184	1.573	1.342	180	1.543	1.325
7-	194	1.596	1.313	187	1.544	1.276
8-	205	1.615	1.272	199	1.571	1.243
9-	217	1.642	1.242	211	1.603	1.217
10-	229	1.671	1.218	228	1.665	1.216
11-	243	1.716	1.210	248	1.731	1.209
12-	261	1.777	1.209	274	1.830	1.224
13-	284	1.856	1.212	297	1.918	1.240
14-	309	1.935	1.213	313	1.989	1.262
15-	330	2.003	1.215	326	2.049	1.289
16	357	2.109	1.247	335	2.102	1.318

* $\frac{W}{H} = \frac{\text{Body weight in grams}}{\text{Body height in cms.}}$

** $\frac{W}{H^2} = \frac{\text{Body weight}}{(\text{Body height})^2}$

*** $\frac{W}{H^3} \times 100 = \frac{\text{Body weight} \times 100}{(\text{Body height})^3}$

average health or nutrition cannot be decided yet.

Apart from the secular feature, it might be reasonable to add in closing a few words on the behavior of the three different index values during the growing years. A glance at the tabulated values makes it plain that none of the three indices remains constant over the whole growth period. If this were the case, individual children of different age and height when characterized by such a weight-height index could be adequately compared to the same average value. Many investigators have attempted to find an index which would remain constant. Especially was this the intention in Kaup's laborious work (17, 18), but it did not work for the growing years of childhood. It is clearly shown by the above computations that all three average index values change from year to year of age. Both Quetelet's and Kaup's index increase in the normal course of children's growth while Rohrer's (or Livi's) index ponderalis decreases somewhat irregularly from 6 years of age through 18 years of age for the average child. (The values of Livi's index are not separately computed because the interrelationship between height and weight is absolutely the same as in Rohrer's index; compare the formulas.)

The change of the ratios, of course, is the reason that one value of the same index cannot characterize average growth; it rather demonstrates that growth of stature and body weight do not proportionately increase throughout the growing years. Therefore, growth cannot be measured by the same height-weight ratio, whichever may be chosen, at

different ages, or what is in practice the same, at different body heights. This changing behavior of the weight-stature ratio within the growing years is the final reason for the construction of height-weight-age tables of growth. Certainly there is no reasonable objection to take the average values of a height-weight index of a given age and a given stature as normal values with which the individual child of the same age and stature may be compared. These normal values, of course, must change from year to year of age, and from unit to unit of stature, corresponding to the pattern of growth. Since, furthermore, in such a comparison between normal and individual index values the height and age variables are kept constant, it is still more logical and simpler to replace the height-weight ratio (whichever may be applied) by weight itself of given age and height (Baldwin (19), Martin (20), Oettinger (21)). However, the basic values for a table of "normal growth" necessitate a large number of individual measurements in each age group because each age has to be subdivided in many height classes, possibly from centimeter to centimeter.

The present Hagerstown material is not yet large enough for the construction of a representative height-weight-age table, especially not in the higher school ages. However, the new results have clearly demonstrated that average weight and also average weight per unit of stature have increased for children of the same age. Therefore, height-weight-age tables have to be reconstructed. But it seems to us better, from the public health point instead of a selection of especially healthy children alone (Baldwin-Wood-Tables) to use the records of all children present at school in the subsequent years of examination. Every selection brings in some kind of an arbitrary element not desirable in a growth table based upon the average like a life table.

SUMMARY

1. The present material reports on nearly 20,000 height measurements in school children of Hagerstown, Maryland, during four successive calendar years, 1937-1940; 10,065 measurements on boys and 9,884 on girls. While the former findings showed a consistent upward trend in body weight, mean stature of the same white school children, 6 to 16 years of age, has been fairly constant through the single calendar years of the period under observation. Therefore mean weight per unit of stature shows the same upward trend.

2. There is to be observed for the large sample a distinct sex difference in the pattern of growth. Its behavior is very much the same for height as it is for weight although the growth rates are different for both measurements. From 6 to 10 years of age, the boys are somewhat taller and heavier than the girls; at the ages 11 to 13 years, the girls exceed significantly the boys in stature and weight but immediately before the 14th year of age is completed, the female line of stature crosses again the curve of the male sex and remains below while the crossing-over for weight occurs soon after 14½ years of age.

3. Consequently there is only one minor deviation of the sex differences in the prepuberty stage of the sexes in so far as the female curve crosses the male curve somewhat earlier for stature than for weight.

This is explained by the fact that the girls at the age of 14 in the majority have already filled out the figure and outweigh the boys of the same stature. The nearly uniform behavior of the sex differences in mean height and weight makes it plain that for the growing years as a whole, and therefore for the physiology of growth, it is not so much the sex but the stature that determines the weight of a growing person, be it a boy or girl.

4. The variability of stature shows a slight upward trend with increasing age, indicating a similar dispersing effect of growth as has been found for variability of body weight. After puberty the variability of height decreases slowly, again being similar to weight. However, the variability of body weight is in every age group and in both sexes considerably greater than of stature. It is a new observation that the sex differences in the variability of height and weight exhibit a similar trend through the growing years and in particular parallel up to puberty very much the sex difference in the pattern of growth itself.

5. Three different weight-stature ratios (Quetelet, Davenport-Kaup, Rohrer-Livi) are computed. They all show a certain secular tendency to increase during the years of observation for children of the same ages since their weight has increased. But neither of them remains constant over the period of normal growth. Therefore, they cannot be used for comparing children of the same or different ages without considering their respective stature. It follows that all three variables — height, weight, age — must be correlated for a table of "normal growth" (height-weight-age tables) which are to be constructed from time to time on the basis of sufficient numbers of observations.

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